

Health and Safety Plan for INEEL CERCLA Disposal Facility Operations

**Idaho
Completion
Project**

Bechtel BWXT Idaho, LLC

October 2004

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Health and Safety Plan for INEEL CERCLA Disposal Facility Operations

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**Idaho Completion Project
Idaho Falls, Idaho 83415**

**Prepared for the
U.S. Department of Energy
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ABSTRACT

This Health and Safety Plan establishes the procedures and requirements used to eliminate and/or minimize health and safety risks to persons performing operational tasks at the INEEL CERCLA Disposal Facility (ICDF), located at the Idaho National Engineering and Environmental Laboratory. This document has been prepared to meet Occupational Safety and Health Administration standard, *29 Code of Federal Regulations* 1910.120, “Hazardous Waste Operations and Emergency Response.”

This Health and Safety Plan contains an assessment of the safety, health, and radiological hazards, along with the associated mitigations, for conducting general operational tasks at the ICDF. This Health and Safety Plan is intended to work in conjunction with other work control documents such as job safety analyses, safe work permits, radiological work permits, and operating procedures. Safety, health, and radiological professionals assigned to support ICDF operations will define the most appropriate hazard control and mitigation measures based on facility-specific conditions and shall make changes to this document and associated work control documents, as appropriate.

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ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ALARA	as low as reasonably achievable
ARDC	Administrative Record and Document Control
ASA	auditable safety analysis
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	<i>Code of Federal Regulations</i>
CPR	cardiopulmonary resuscitation
dBA	decibel A-weighted
dBc	decibel C-weighted
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EDF	engineering design file
EPA	U.S. Environmental Protection Agency
ERO	Emergency Response Organization
FR	<i>Federal Register</i>
GI	gastrointestinal
HASP	health and safety plan
HAZWOPER	hazardous waste operations and emergency response
HSO	health and safety officer
IARC	International Agency for Research on Cancer
ICDF	INEEL CERCLA Disposal Facility
IDLH	immediately dangerous to life or health
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center

ISMS	Integrated Safety Management System
JSA	job safety analysis
M&O	management and operating (contractor)
MCP	management control procedure
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NTP	National Toxicology Program
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
PE	project engineer
PEL	permissible exposure limit
PM	project manager
POC	point of contact
PPE	personal protective equipment
PRD	program requirements document
QE	quality engineer
RadCon	radiological control
RBA	radiological buffer area
RCA	radiologically controlled area
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RE	radiological engineer
RWP	radiological work permit
SSSTF	Staging, Storage, Sizing, and Treatment Facility
SWP	safe work permit
TLV	threshold limit value

TSCA	Toxic Substances Control Act
TWA	time-weighted average
USC	<i>United States Code</i>
UV	ultraviolet light
VPP	Voluntary Protection Program
WCC	Warning Communications Center

Health and Safety Plan for INEEL CERCLA Disposal Facility Operations

1. INTRODUCTION

This Health and Safety Plan (HASP) identifies health and safety hazards and requirements used to eliminate and/or minimize the hazards during INEEL CERCLA Disposal Facility (ICDF) operations. This HASP has been written to meet the requirements of the Occupational Safety and Health Administration (OSHA) standard, 29 *Code of Federal Regulations* (CFR) 1910.120, “Hazardous Waste Operations and Emergency Response.”

1.1 Purpose

This HASP has been prepared to address ICDF operational hazards and associated mitigations. Additional work control documents such as job safety analyses (JSAs), operational procedures, safe work permits (SWPs), radiological work permits (RWPs), and program requirements documents (PRDs) will further define ICDF operational hazards, mitigations, and procedural requirements. This HASP will be reviewed and revised, as appropriate, by ICDF health and safety and radiological control (RadCon) personnel to ensure its effectiveness and suitability for ICDF operations.

Changes in this latest revision to this HASP reflect the actual operational practices at the ICDF. The ICDF is operated by a team of subcontractors with the prime management and operating (M&O) contractor providing oversight. This latest revision addresses those requirements specific to subcontracted work as well as applicable requirements for oversight personnel. No changes to this HASP may be made without the review and approval of both the M&O contractor and the operations subcontractor.

1.2 Idaho National Engineering and Environmental Laboratory Site Description

The Idaho National Engineering and Environmental Laboratory (INEEL) is a U.S. government-owned test site managed by the U.S. Department of Energy (DOE) and located in southeastern Idaho 51.5 km (32 mi) west of Idaho Falls (Figure 1-1). The INEEL encompasses approximately 2,305 m² (890 mi²) of the northeastern portion of the Eastern Snake River Plain.

The U.S. Atomic Energy Commission initially established the site in 1949 as the National Reactor Testing Station for nuclear energy research and related activities. In 1952, the Site expanded its function and began accepting shipments of transuranic radionuclides and radioactive low-level waste. Currently, the INEEL is used to support the engineering efforts and operations of the DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs.

In November 1989, because of confirmed contaminant releases to the environment, the U.S. Environmental Protection Agency (EPA) placed the INEEL on the “National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule” (54 FR 48184). In response to this listing, the DOE, the EPA, and the State of Idaho negotiated the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991).

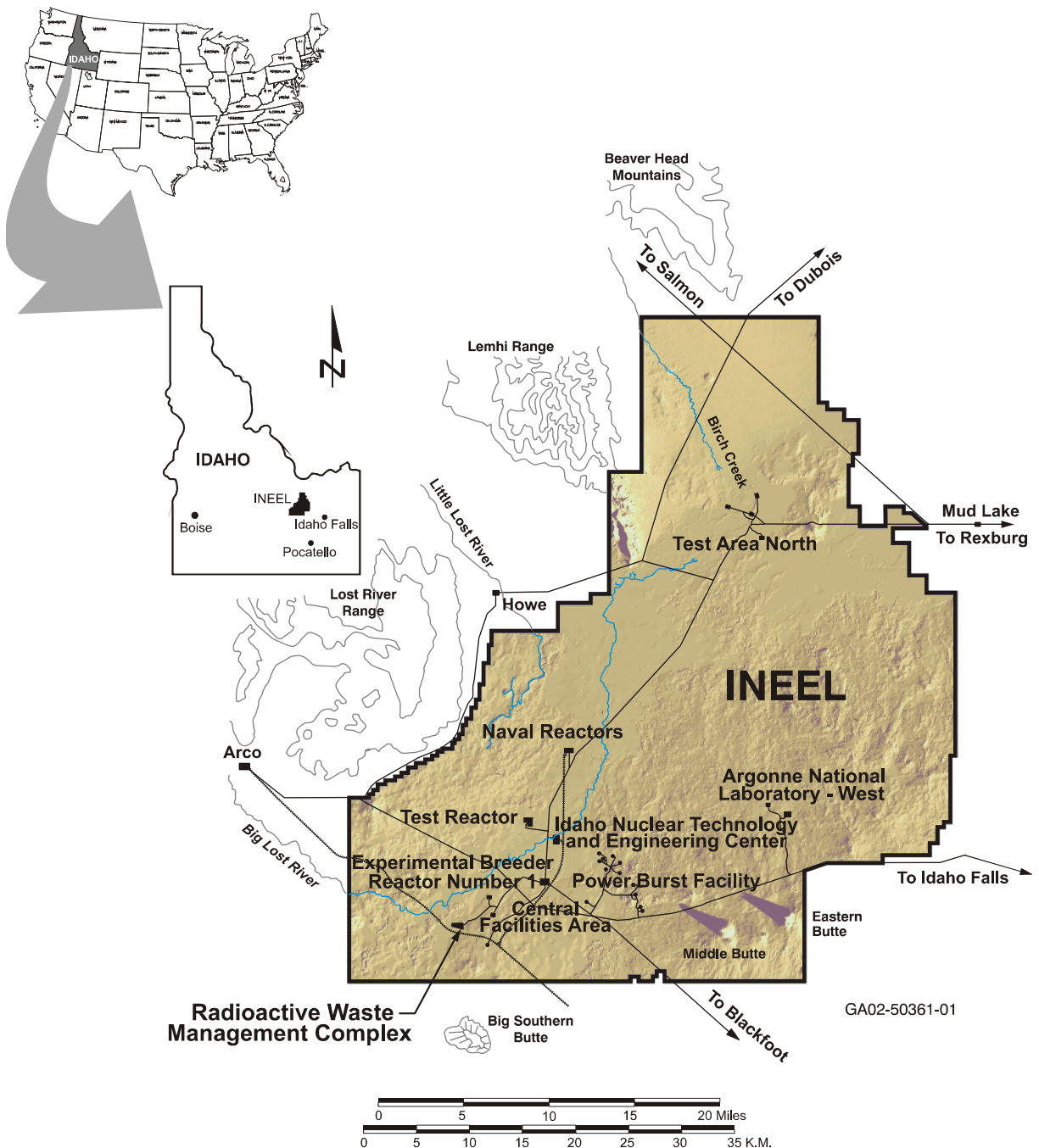


Figure 1-1. Map of the Idaho National Engineering and Environmental Laboratory.

The Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory (DOE-ID 1991)—which was signed in 1991—established the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq.), the Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq.), and the Idaho Hazardous Waste Management Act (Idaho Code § 39-4401 et seq.).

1.3 Background and ICDF Description

The U.S. Department of Energy Idaho Operations Office (DOE-ID) authorized a remedial action work plan for the Idaho Nuclear Technology and Engineering Center (INTEC) in accordance with the *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13* (DOE-ID 1999). The Record of Decision requires the removal and on-Site disposal of some of the CERCLA remediation waste generated within the boundaries of the INEEL in addition to the waste from INTEC.

The ICDF is an on-Site, engineered facility—located southwest of INTEC and adjacent to the existing percolation ponds—that meets the substantive requirements of the RCRA Subtitle C (42 USC § 6901 et seq.); Idaho Hazardous Waste Management Act (Idaho Code § 39-4401 et seq.); DOE Order 435.1, “Radioactive Waste Management”; and Toxic Substances Control Act (TSCA) polychlorinated biphenyl landfill design and construction requirements (15 USC § 2601 et seq.). Designed and authorized to accept not only Waste Area Group 3 waste, but also waste from other INEEL CERCLA actions, the ICDF Complex includes the necessary subsystems and support facilities to provide a complete waste disposal system.

The major components (see also Figure 1-2) of the ICDF Complex include:

- The disposal cells (landfill)
- Two evaporation pond cells
- The Staging, Storage, Sizing, and Treatment Facility (SSSTF).

The ICDF Complex, including the SSSTF and a buffer zone, covers approximately 50 acres with a disposal capacity of approximately 510,000 yd³. The evaporation pond, designated as equivalent to a RCRA Corrective Action Management Unit in the Operable Unit 3-13 Record of Decision (DOE-ID 1999), is the disposal site for ICDF leachate and other aqueous waste generated as a result of operating the ICDF Complex. The evaporation pond has two cells that are capable of containing a total of 4.4 million gal of water. It also accepts decontamination water and water from CERCLA-generated well purging, sampling, and well development activities. The ICDF leachate is pumped directly to the evaporation pond, and the pump system tracks the volume of waste disposed of at the pond.

The SSSTF is the center for all waste handling and processing for the ICDF Complex. It is designed to provide centralized receipt, inspection, treatment, and segregation areas necessary to stage, store, and size incoming waste from various INEEL CERCLA remediation sites prior to ICDF disposal or shipment off-Site.

1.4 ICDF Components and Operations

Operational aspects of the ICDF Complex are described in detail in the facility standard operating procedures. Below are brief summaries of the general operational processes at the ICDF.

1.4.1 Initial Waste Arrival at ICDF

Waste arrives at the ICDF Complex from various on-Site INEEL CERCLA remediation sites. These sites and waste forms are grouped into the following categories: (1) landfill waste (waste meeting the ICDF landfill waste acceptance criteria without treatment); (2) stabilization waste (non-aqueous waste requiring stabilization or debris treatment in the SSSTF); (3) well development/purge water (aqueous waste from well purging and development activities); and (4) miscellaneous case-by-case waste.

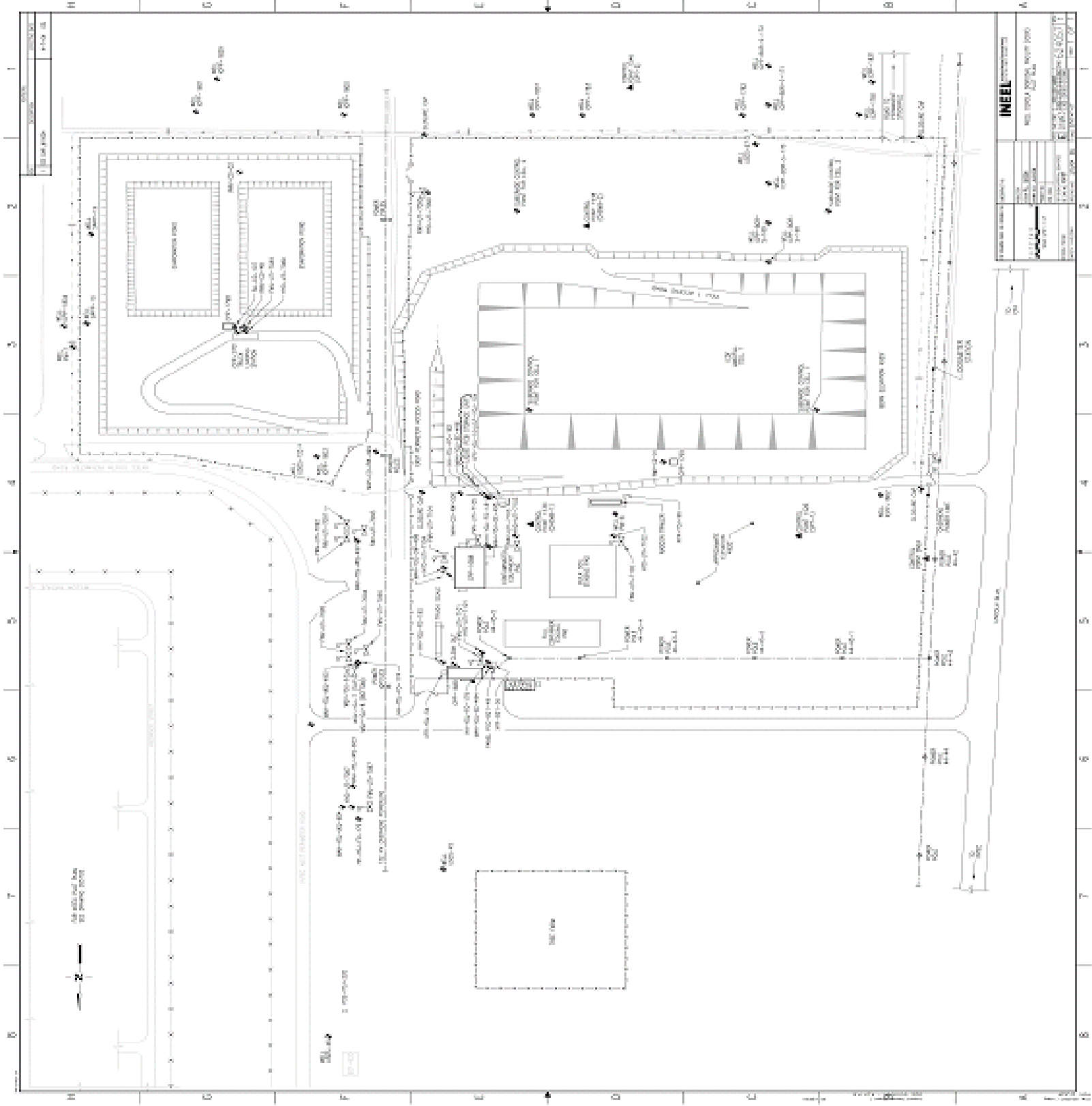


Figure 1-2. Location of the ICDF Complex components.

An initial inspection is performed to verify that all shipping containers are intact and all paperwork is in order. The waste is then weighed and included in the waste tracking system.

1.4.2 Waste Storage and Staging

After acceptance of the incoming waste shipments at the ICDF, the transport vehicles may deliver the loads directly to the ICDF landfill or evaporation pond. Usually waste delivered directly from a remediation site is delivered to a queue area at the ICDF Complex before placement into the landfill. Storage and staging areas are provided for a small number of containers of each waste type and bulk soil to allow for delays in processing and to stage waste for treatment.

1.4.3 Waste Treatment

The SSSTF provides treatment capabilities to treat INEEL CERCLA waste and secondary waste streams generated during ICDF Complex operations, if needed. The purpose of treatment is to prepare INEEL CERCLA waste that does not initially meet the ICDF landfill waste acceptance criteria for final disposal in the ICDF landfill or at an off-Site disposal facility. The main components of the stabilization process are the vertical lift tipper, a mixer unit, a bulk-bag unloader, and an air filtration system.

1.4.4 Disposal

The majority of the material sent for disposal in the ICDF will be bulk soil. The placement of this material is accomplished by standard construction methods for unloading, spreading, grading, and compaction of soil unless already containerized. Moisture treatment of the soil is used to control fugitive dust and to help achieve adequate compaction.

Containers, including wooden and steel boxes and drums, will also be sent for disposal at the ICDF. The boxes may contain soil, stabilized soil material, scrap metal, and building debris. The boxes will be unloaded with specialized equipment.

Miscellaneous debris will also be sent to the ICDF. This material may be unloaded using specialized equipment, appropriate and consistent with operation procedures, and will be placed so that excessive localized void space will not be created.

1.4.5 Container Storage and Staging

After clearance for radiological contamination, the empty containers are delivered to a queuing area or staging pad for empty roll-off containers until they are required for further use. Empty drums and/or standard waste boxes will be sized or reused, as appropriate.

1.4.6 Leachate Conveyance System

A leachate conveyance system has been incorporated into the design of the ICDF. This system transfers leachate from the landfill sumps to the evaporation pond.

1.4.7 Evaporation Pond

The evaporation pond consists of two cells that accept aqueous waste such as landfill leachate and other liquid waste sources from INEEL CERCLA sites or from ICDF Complex operations. The water associated with the waste will evaporate, leaving behind the solid materials. After up to 12 in. has accumulated, the sediment material will be removed and treated (as needed) and disposed of in the ICDF

landfill. Routine tasks associated with management of the ICDF evaporation pond include pond cell wash down and transfer of aqueous waste to the evaporation pond.

1.4.8 Additional ICDF Tasks

Additional tasks associated with ICDF operations include preventative maintenance, inspections, road maintenance, fencing inspection and repair, storm water ditches/erosion control inspection, repair and maintenance, evaporation pond sampling, leachate collection recovery system sampling, other routine sampling tasks, and groundwater monitoring.

2. HAZARD IDENTIFICATION AND MITIGATION

The ICDF operations will involve the transportation, handling, storage, treatment, and disposal of INEEL CERCLA waste. This waste includes low-level, mixed low-level, hazardous, and limited quantities of TSCA-regulated waste. Operation of the ICDF will present physical, chemical, and radiological hazards to operations personnel; identification and mitigation of these hazards are imperative to prevent injury or exposure to personnel conducting these activities. The primary objective of this section is to identify existing and anticipated hazards based on ICDF operations and to provide controls to eliminate or mitigate these hazards. This includes:

- Evaluation of ICDF operations to determine the extent that potential industrial safety, radiological, chemical, and physical hazards may affect facility personnel
- Establishment of the necessary monitoring and sampling required to evaluate exposure and contamination levels, determine action levels to prevent exposures, and provide specific actions to be followed if action levels are reached
- Determination of necessary engineering controls, isolation methods, administrative controls, work practices, and (where these measures will not adequately control hazards) personal protective equipment (PPE) to further protect project personnel from hazards.

The following section describes the general chemical, radiological, safety, and environmental hazards that personnel may encounter while conducting ICDF operational activities. Job- and task-specific hazard mitigations are covered in other work control documents (e.g., JSAs, standard operating procedures, RWPs, SWPs, work orders, and PRDs).

2.1 Chemical and Radiological Hazards and Mitigation

Personnel may be exposed to chemical and radiological agents while conducting ICDF operations. Engineering controls will be implemented (whenever possible) along with adequate work practice controls (administrative), real-time monitoring of personnel exposure to contaminants, and ICDF facility-specific hazard training to further mitigate potential hazards and exposures. Formal pre-planning (i.e., job walk-downs and prejob briefings), written procedures, JSAs, and other work controls will be written based on the job- or task-specific hazards.

The “INEEL CERCLA Disposal Facility Short-Term Risk Assessment” (EDF-ER-327) identifies three chemicals that exceed the hazard index for non-cancer effects to the evaporation pond operator. The primary contributors to non-cancer risk are 2-nitroaniline, 3-nitroaniline, and 4-nitroaniline. These materials tend to remain in solution because of their solubility. Evaporated liquids will tend to leave precipitous materials behind containing the nitroaniline compounds. To avoid personnel exposure to these compounds, personnel will be restricted from skin contact, which is the primary exposure route of these compounds. Some of these constituents are released during evaporation, which also affects workers in the vicinity. Once waste water containing any of the nitroaniline compounds is placed in the evaporation ponds, further analysis will be performed to ensure that workers at the evaporation pond and at nearby areas (truck unloading station and the tank/container storage area) are not exposed to unsafe levels.

In addition to the nitroaniline compounds, the “INEEL CERCLA Disposal Facility Short-Term Risk Assessment” (EDF-ER-327) also identifies arsenic and chromium as primary contributors to the potential cumulative carcinogenic risk for ICDF employees. Particular attention will be given to waste

streams containing these compounds to ensure that controls are adequate to prevent unsafe exposure levels.

An initial evaluation of the waste identified for placement in the ICDF was performed and documented in EDF-ER-264, "INEEL CERCLA Disposal Facility Design Inventory." This document contains tables of radiological and chemical (organic and inorganic) contaminants of concern based on preliminary sample data from identified waste stream sources. Since the design inventory was based on preliminary data for all waste identified for placement at the ICDF, further evaluations need to be made. The additional evaluations will identify specific contaminants of concern for each waste stream using the Integrated Waste Tracking System Material and Waste Characterization Profile or equivalent. This information will be used to identify sampling and monitoring needs as well as any additional training or work control requirements.

Table 2-1 contains information for the compounds of potential concern, which have a percent contribution greater than or equal to one for both potential excess lifetime cancer risk and potential noncarcinogenic risk, as identified in Appendix D of EDF-ER-327. The table also identifies several non-waste compounds of concern, which could otherwise be encountered at the ICDF.

2.1.1 Routes of Exposure

Potential exposure pathways include those listed below:

- **Inhalation** of radiological and chemical contaminated soil or fugitive dusts during waste handling, disposal, or decontamination tasks.
- **Skin absorption and contact** with radiological and chemical contaminated soil or surfaces during waste handling, disposal, decontamination, or system maintenance tasks. Radiological and chemical contaminants can be absorbed through the skin, resulting in uptake through the skin and/or skin contamination.
- **Ingestion** of radiological and chemical contaminated soil or materials adsorbed to dust particles or waste residues, resulting in potential uptake of contaminants through the gastrointestinal (GI) tract that could result in GI irritation, internal tissue irradiation, and/or deposition to target organs.
- **Injection** of radiological and chemical contaminated materials by breaking of the skin or migration through an existing wound, resulting in localized irritation, contamination, uptake of soluble contaminants, and deposition of insoluble contaminants.

2.2 Radiological Exposure Control

Radiation exposure limits are based on requirements contained in 10 CFR 835, Subpart C, "Standards for Internal and External Exposure," and INEEL policies and procedures. An administrative control level has been established for the INEEL. The administrative limit imposed by DOE is to keep worker exposure less than 2 rem/yr. In addition, radiation workers have assigned as low as reasonably achievable (ALARA) goals. The dose limits and ALARA goals are implemented in company procedures and apply to occupational radiation dose, which excludes doses from background, therapeutic and diagnostic radiation, medical radiation, and participation as a subject in medical research programs.

Table 2-1. Evaluation of chemical agents that may be encountered at the ICDF.

Material or Chemical (CAS #)	Exposure Limit ^a (PEL/TLV)	Routes of Exposure ^b	Indicators or Symptoms of Overexposure (Acute and Chronic)	Target Organs/System	Carcinogen? (Source) ^c	Exposure Potential (All Routes without regard to PPE)
Aluminum (7429-90-5)	Metal dust: 10 mg/m ³ 8-hr TWA Soluble salts: 2 mg/m ³ TWA	Ilh, Ig, Con	Eye, skin, and respiratory system irritation	Eyes, skin, respiratory system	No	LOW^d
Antimony (7440-36-0)	0.5 mg/m ³ TWA	Ilh, Ig, Con	Eye, skin, nose, throat, and mouth irritation; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, cardiovascular system	No	LOW^d
Aroclor-1254 (11097-69-1)	0.5 mg/m ³ TWA	Ilh, Ig, S, Con	Eye irritation; chloracne; liver damage; reproductive effects	Skin, eyes, liver, reproductive system	Potential – NIOSH	LOW^d
Aroclor-1260 (11096-82-5)	Not established	Ilh, S, Con	Eye irritation, eye inflammation, and swelling of adjoining tissues; GI disturbances; discoloration of the nail and skin; cancer hazard; liver damage; delayed adverse health effects; chloracne	Eyes, GI, skin, liver	Potential – NIOSH	LOW^d
Arsenic (7440-38-2)	0.01 mg/m ³ TWA and regulated by 29 CFR 1910.1018	Ilh, Ig, S, Con	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin	Liver, kidneys, skin, lungs, lymphatic system	IARC – 1 EPA – A Yes – OSHA TLV – A1 NTP – K	LOW^d
Barium (7440-39-3)	0.5 mg/m ³ TWA	Ilh, Ig, Con	Eye, skin, and upper respiratory system irritation; skin burns; gastroenteritis; muscle spasm; slow pulse; irregular heart beat; blood potassium imbalance	Eyes, skin, respiratory system, heart, CNS	No	LOW^d
Benzene (71-43-2)	0.5 ppm TWA and regulated by 29 CFR 1910.1028	Ilh, Ig, S, Con	Eye, skin, nose and respiratory system irritation; giddiness; headache; nausea; staggered gait; fatigue; anorexia; weakness; exhaustion; dermatitis; bone marrow depression	Eyes, skin, respiratory system, blood, CNS, bone marrow	EPA – A,K IARC – 1 NTP – K Yes – OSHA TLV – A1	LOW^d

Table 2-1. (continued).

Material or Chemical (CAS #)	Exposure Limit ^a (PEL/TLV)	Routes of Exposure ^b	Indicators or Symptoms of Overexposure (Acute and Chronic)	Target Organs/System	Carcinogen? (Source) ^c	Exposure Potential (All Routes without regard to PPE)
Benzo(a)pyrene (50-32-8)	0.2 mg/m ³ TWA	Ilh, Ig, S, Con	Eye, skin, respiratory tract, and digestive tract irritation	Eye, skin, respiratory tract, GI	Potential – NIOSH IARC – 2A NTP – R TLV – A2	LOW^d
Cadmium (7440-43-9)	0.005 mg/m ³ TWA and is regulated by 29 CFR 1910.1027	Ilh, Ig	Pulmonary edema, difficulty breathing, cough, chest tightness, substernal pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; loss of sense of smell, emphysema, excess protein in the urine, mild anemia	Respiratory system, kidneys, prostate, blood	Potential – NIOSH IARC – 1 NTP – K Yes – OSHA TLV – A2	LOW^d
Chloromethane (Methyl chloride) (74-87-3)	50 ppm TWA	Ilh, S, Con	Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage	CNS, liver, kidneys, reproductive system	Potential – NIOSH	LOW^d
Chromium (7440-47-3)	(VI) inorganic compounds: 0.05 mg/m ³ TWA	Ilh, Ig, Con	Eye and skin irritation; lung fibrosis	Eyes, skin, respiratory system	(VI): EPA – A,K IARC – 1 NTP – K TLV – A1	LOW^d
1,4-Dichlorobenzene (106-46-7)	10 ppm TWA	Ilh, Ig, S, Con	Eye irritation; inflamed mucous membrane; headache, anorexia, nausea, vomiting; weight loss, jaundice, liver, kidney injury	Liver, respiratory system, eyes, kidneys, skin	Potential – NIOSH NTP – R	LOW^d
Diesel fuel (8008-20-6)	100 mg/m ³ TWA (as total hydrocarbons)	Ilh, Ig, S, Con	Eye irritation; respiratory system changes; dermatitis	Eye, respiratory system	No	Moderate potential. Will be used to refuel equipment.
Diesel exhaust	None specifically established – dependent on specific diesel exhaust component	Ilh, Con	Respiratory, nose, throat, or lung irritation with stinging and redness of the eyes; headache; nausea; dizziness; unconsciousness	Eyes, respiratory system	IARC – 2A NTP – R Potential – NIOSH	Moderate potential. Numerous exhaust sources at the ICDF area.

Table 2-1. (continued).

Material or Chemical (CAS #)	Exposure Limit ^a (PEL/TLV)	Routes of Exposure ^b	Indicators or Symptoms of Overexposure (Acute and Chronic)	Target Organs/System	Carcinogen? (Source) ^c	Exposure Potential (All Routes without regard to PPE)
Iron (7439-89-6)	1 mg/m ³ TWA (soluble iron salts) 5 mg/m ³ TWA (iron oxide dust and fume)	Ilh, Ig, Con	Eyes and mucous membrane irritation; abdominal pain, diarrhea, vomiting; possible liver damage	Eyes, skin, respiratory system, liver, GI	No	LOW^d
Kepone (Chlordecone) (143-50-0)	None established (NIOSH REL 0.001 mg/m ³ TWA)	Ilh, Ig, S, Con	Headache, nervousness, tremor; liver, kidney damage; visual disturbance; inability to control voluntary muscle movements, chest pain, skin redness; testicular atrophy, low sperm count	Eyes, skin, respiratory system, CNS, liver, kidneys, reproductive system	Potential – NIOSH	LOW^d
Manganese (7439-96-5)	0.2 mg/m ³ TWA	Ilh, Ig	Parkinson's; loss of strength, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, difficulty breathing, flu-like fever; low back pain; vomiting; malaise; fatigue; kidney damage	Respiratory system, CNS, blood, kidneys	No	LOW^d
Mercury (7439-97-6)	Alkyl compounds 0.01 mg/m ³ TWA Aryl compounds 0.1 mg/m ³ TWA Elemental and inorganic compounds 0.025 mg/m ³ TWA	Ilh, Ig, S, Con	Irritation eyes, skin; cough, chest pain, difficulty breathing, bronchitis inflammation of the lungs; tremor, insomnia, irritability, indecision, headache, fatigue, weakness; inflammation of the mouth, salivation; gastrointestinal disturbance, anorexia, weight loss; high protein in the urine	Eyes, skin, respiratory system, CNS, kidneys	No	LOW^d

Table 2-1. (continued).

Material or Chemical (CAS #)	Exposure Limit ^a (PEL/TLV)	Routes of Exposure ^b	Indicators or Symptoms of Overexposure (Acute and Chronic)	Target Organs/System	Carcinogen? (Source) ^c	Exposure Potential (All Routes without regard to PPE)
Molybdenum (7439-98-7)	Soluble compounds 0.5 mg/m ³ TWA (respirable) Insoluble compounds 10 mg/m ³ TWA, 3 mg/m ³ TWA (respirable)	Ih, Ig, Con	Eyes, nose, and throat irritation; anorexia, diarrhea, weight loss; listlessness; liver, kidney damage	Eyes, respiratory system, liver, kidneys	No	LOW^d
2-Nitroaniline (88-74-4), 3-Nitroaniline (99-09-2)	TLV not established	Ih, Ig, S, Con	Nose and throat irritation; blue/purple skin; inability to control voluntary muscle movements; rapid heart beat; difficulty breathing; irritability; vomiting; diarrhea; convulsions; respiratory arrest; anemia; jaundice	Respiratory system, blood, heart, liver	No	LOW^d . See discussion for risk mitigation associated with work in the evaporation pond.
4-Nitroaniline (100-01-6)	3 mg/m ³ TWA	Ih, Ig, S, Con	Nose and throat irritation; blue/purple skin; inability to control voluntary muscle movements; rapid heart beat; difficulty breathing; irritability; vomiting; diarrhea; convulsions; respiratory arrest; anemia; jaundice	Respiratory system, blood, heart, liver	No	LOW^d . See discussion for risk mitigation associated with work in the evaporation pond.
1,1,2-Trichloroethane (79-00-5)	10 ppm TWA	Ih, Ig, S, Con	Eye and nose irritation; CNS depressant; liver and kidney damage; dermatitis	Eyes, respiratory system, CNS, liver, kidneys	Potential – NIOSH	LOW^d
Trichloroethylene (79-01-6)	50 ppm TWA	Ih, Ig, S, Con	Eye and skin irritation; headache, vertigo; visual disturbance, fatigue, giddiness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, pricking skin; liver injury	Eyes, skin, respiratory system, heart, liver, kidneys, CNS	Potential – NIOSH IARC – 2A NTP - R	LOW^d
Radionuclides (whole body exposure)	ALARA, dose limit—per radiological work permit	Whole body	Cell damage, cell death, cancer, precancerous lesions, benign tumors, cataracts, skin changes, congenital defects	Blood-forming cells, GI tract, and rapidly dividing cells	Yes	Moderate potential.

Table 2-1. (continued).

Material or Chemical (CAS #)	Exposure Limit ^a (PEL/TLV)	Routes of Exposure ^b	Indicators or Symptoms of Overexposure (Acute and Chronic)	Target Organs/System	Carcinogen? (Source) ^c	Exposure Potential (All Routes without regard to PPE)
Radionuclides (fixed and removable surface contamination)	Posting of contamination areas per applicable company policies and procedures	Ilh, Ig, Con	Cell damage, cell death, cancer, precancerous lesions, benign tumors, cataracts, skin changes, congenital defects	GI tract, ionization of internal tissue	Yes	Low—moderate potential.
<p>a. Lowest value between the PEL or TLV as reported in the <i>Guide to Occupational Exposure Values</i> (ACGIH 2004).</p> <p>b. (Ilh) inhalation; (Ig) ingestion; (S) skin absorption; (Con) contact hazard.</p> <p>c. If yes, identify agency and appropriate designation (ACGIH A1 or A2, NIOSH, OSHA, IARC, NTP).</p> <p>d. Actual risk and controls will be established based on characterization and exposure potential experience from the respective excavation site.</p> <p>ALARA = as low as reasonably achievable</p> <p>ACGIH = American Conference of Governmental Industrial Hygienists</p> <p>CAS = Chemical Abstract Service</p> <p>CFR = <i>Code of Federal Regulations</i></p> <p>CNS = central nervous system</p> <p>EPA = U.S. Environmental Protection Agency</p> <p>GI = gastrointestinal</p> <p>IARC = International Agency for Research on Cancer</p> <p>ICDF = INEEL CERCLA Disposal Facility</p> <p>NIOSH = National Institute of Occupational Safety and Health</p> <p>NTP = National Toxicology Program</p> <p>OSHA = Occupational Safety and Health Administration</p> <p>PEL = permissible exposure limit</p> <p>PPE = personal protective equipment</p> <p>TWA = time-weighted average</p> <p>TLV = threshold limit value</p>						

The ICDF visitors may be permitted to enter fenced areas of the ICDF Complex, but they will be restricted to administrative areas only until they have received appropriate training. Until such training has been completed, visitors will be denied access to radiological buffer areas (RBAs), radiological areas, or radioactive material areas unless permission is granted from RadCon personnel and a trained escort is provided. The visitor will be provided information on radiological conditions and the visitor must be willing to accept the risks of radiation exposure. This information will be presented during the site access briefing. These escorted visitors will be provided radiation dosimetry to maintain exposure records, when required.

The ICDF Complex will be managed to ensure that (1) acceptable short-term risk levels will be met for members of the community and non-radiation workers, and (2) OSHA and DOE dose limits will not be exceeded for radiation workers. The primary methods used to control workplace exposure are facility and equipment design features. These controls are augmented with both area entry/exit requirements that control access to and from radiological areas and RWPs that support radiological work. In addition, proposed maintenance and modification plans are reviewed to identify and incorporate radiological protection requirements.

The entire fenced area of the ICDF is a radiologically controlled area (RCA), requiring General Employee Radiological Training or escort as minimum requirements for entry. There are separate radiological areas within the RCA, each with its own unique requirements for entry and egress. These specific requirements are posted on signs and barricades around each area. Operations personnel shall follow the instructions posted for each area prior to entry.

2.3 Safety and Physical Hazards and Mitigation

The following sections describe specific industrial safety hazards and procedures to be followed to eliminate or minimize potential hazards to project personnel. Additional requirements may be found in OSHA standards, applicable PRDs in the *Subcontractor Requirements Manual*, or in M&O contractor management control procedures (MCPs).

2.3.1 Material Handling and Back Strain

Personnel will not physically lift objects weighing more than 50 lb or 33% of their body weight (whichever is less) alone. Mechanical and hydraulic lifting devices should be used to move materials whenever possible. Operations personnel who lift or otherwise handle equipment or materials will be trained in proper lifting and material handling techniques. Health and safety personnel will conduct ergonomic evaluations of various ICDF operations to determine the potential ergonomic hazards and provide recommendations to mitigate these hazards.

2.3.2 Repetitive Motion and Musculoskeletal Disorders

The ICDF operational tasks to be conducted may expose personnel to repetitive-motion hazards, undue physical stress, overexertion, awkward postures, or other ergonomic risk factors that could lead to musculoskeletal disorders. Musculoskeletal disorders can cause a number of conditions, including pain, numbness, tingling, stiff joints, difficulty moving, muscle loss, and sometimes paralysis. The ICDF health and safety personnel will evaluate project tasks and provide recommendations to reduce the potential for musculoskeletal disorders.

2.3.3 Working and Walking Surfaces

Slippery work surfaces can increase the likelihood of back injuries, overexertion injuries, slips, and falls. Outdoor ICDF operations present inherent tripping hazards because of uneven surfaces and terrain. Additionally, the potential for slip, trip, and fall hazards will increase during winter months because of ice- and snow-covered surfaces. Slip and trip hazards will be eliminated whenever possible. All personnel will be made aware of tripping hazards that cannot be eliminated. Personnel shall wear appropriate footwear having proper tread for the work to be performed (consider all weather conditions); heavy/durable materials (leather); adequate ankle support; arch support; additional protection as required for the task (e.g., steel toe, steel shank, metatarsal); and shock absorption.

2.3.4 Elevated Work Areas

Personnel may sometimes be required to work on elevated equipment or at heights above 6 ft for construction activities (or 4 ft for process/operations activities). During such work, employees will comply with requirements from applicable PRDs and MCPs. Whenever possible, engineering controls (guardrails) will be put in place to protect the worker. Personnel will be properly trained prior to working in a fall hazard situation. Where required, a fall protection plan will be written.

2.3.5 Powered Equipment and Tools

Powered equipment and tools used during ICDF operations present potential physical hazards (e.g., pinch points, electrical hazards, flying debris, struck-by, and caught-between) to personnel operating them. All portable equipment and tools will be properly maintained and used by qualified individuals and in accordance with the manufacturer's specifications. At no time will safety guards be removed. The user will inspect all tools before use.

2.3.6 Electrical Hazards and Energized Systems

Electrical equipment and tools, as well as overhead and underground lines associated with ICDF operations, could pose shock or electrocution hazards to personnel. If work on energized systems is necessary, these practices will conform to the applicable electrical safety and lockout/tagout requirements in the *Subcontractor Requirements Manual*, applicable MCPs, the subcontractor's approved lockout/tagout program, and Parts I through III of the National Fire Protection Association (NFPA) 70E, "Standard for Electrical Safety Requirements for Employee Workplaces." When working around overhead lines, clearances will be maintained at all times. Additionally, all underground utilities and installations will be identified before conducting excavation activities. Any excavating within 5 ft horizontal and 2 ft vertical of potentially energized systems shall be performed by hand.

2.3.7 Fire and Flammable Materials Hazards

Flammable hazards may include transfer and storage of flammable or combustible liquids in the ICDF operations area and/or chemical reaction from incompatible waste materials. Portable fire extinguishers are strategically located at the facility to combat Class ABC fires. They will be located in all active ICDF operations areas, on or near all facility equipment that has exhaust heat sources, and on or near all equipment capable of generating ignition or having the potential to spark.

2.3.7.1 Combustible Materials. Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. A fire protection engineer should be contacted if questions arise about potential ignition sources. The accumulation of combustible

materials will be strictly controlled at the ICDF. Class A combustibles such as trash, cardboard, rags, wood, and plastic will be properly disposed of in appropriate waste containers.

2.3.7.2 Flammable and Combustible Liquids. Fuel used at the ICDF for fueling must be safely stored, handled, and used. Only flammable liquid containers approved by the Factory Mutual or Underwriters Laboratories and labeled with the contents will be used to store fuel. All fuel containers will be stored at least 50 ft from any facilities and ignition sources or they will be stored inside an approved flammable storage cabinet. Portable motorized equipment (e.g., generators and light plants) will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions before being refueled to minimize the potential for a fuel fire.

2.3.7.3 Welding, Cutting, or Grinding. Personnel conducting welding, cutting, or grinding tasks may be exposed to molten metal, slag, and flying debris. Additionally, a fire potential exists if combustible materials are not cleared from the work area. All combustible materials will be removed, covered, or shielded within 35 ft of the hot work operation. A trained fire watch will be assigned during the operation unless performed in a designated hot work area.

2.3.8 Pressurized Systems

Compressors and compressed gases will be used in support of ICDF operations. The hazards presented to personnel, equipment, facilities, or the environment because of inadequately designed or improperly operated pressure systems include blast effects, shrapnel, fluid jets, equipment damage, personnel injury, and death. These systems can include pneumatic, hydraulic, or compressed gas systems. Inspection, maintenance, and testing of systems and components will be in conformance with the manufacturer's specifications and applicable American National Standards Institute requirements.

All pressure systems will be operated in the designed operating pressure range. Additionally, all hoses, fittings, lines, gauges, and system components will be rated for the system for at least the maximum allowable working pressure. The project safety professional should be consulted about any questions of pressure systems in use at the project site.

2.3.9 Heavy Equipment and Moving Machinery

Hazards associated with the operation of heavy equipment include injury to personnel (e.g., struck-by and caught-between hazards) and equipment and property damage. All heavy equipment will be operated in the manner in which it was intended and in accordance with the manufacturer's instructions. Only authorized, qualified personnel will be allowed to operate equipment.

General safe practices will include the following:

- All heavy equipment will have backup alarms
- Walking directly behind or to the side of heavy equipment without the operator's knowledge is prohibited
- When necessary, the equipment operator will maintain communication with a designated person who will be responsible for providing direct voice contact or approved standard hand signals
- All unattended equipment will have appropriate reflectors or be barricaded if left on roadways
- All parked equipment will have the parking brake set and chocks will be used when equipment is parked on inclines

- The swing radius of heavy equipment will be adequately barricaded or marked to prevent personnel from entering into the swing radius
- High visibility clothing (vests) will be used by personnel in the vicinity of operating heavy equipment.

2.3.10 Excavation, Surface Penetrations, and Outages

Operation of the ICDF might require limited excavation activities in conjunction with grading operations as disposal cells are used. All surface penetrations and related outages will be coordinated through the point of contact (POC) and will require submittal of an outage request for outages (e.g., road, electrical, and water). Other specific outage requirements are addressed in the special conditions section of the management and operating contract. No surface penetrations will be allowed or conducted until the area has been evaluated and an approved subsurface evaluation documented.

2.3.11 Hoisting and Rigging of Equipment

A hoist or winch system may be used in support of ICDF maintenance tasks. Additionally, cranes may be used to lift debris or waste containers into the landfill or to place the waste into a storage or staging area. All hoisting and rigging operations will be performed in accordance with the *Subcontractor Requirements Manual* and the most current edition of DOE-STD-1090, "Hoisting and Rigging," as applicable for these ICDF operations. Hoisting and rigging equipment will show evidence of a current inspection (e.g., tag) and be inspected before use by qualified personnel. Additionally, if mobile crane or boom trucks are used in support of ICDF operations, the operator or designated person for mobile cranes or boom trucks will perform a visual inspection each day or before use (if the crane has not been in regular service).

2.3.12 Personal Protective Equipment

Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. In addition, PPE can increase the risk of heat stress. Work activities at the task site will be modified as necessary to ensure that personnel are able to work safely in the required PPE. All personnel who wear PPE will be trained in its use and limitations.

2.3.13 Decontamination

Decontamination of waste containers and vehicles might be required as part of ICDF operations. Decontamination procedures for personnel and equipment are detailed in Section 11. Potential hazards to personnel conducting decontamination tasks include back strain; slip, trip, and fall hazards; and cross-contamination from contaminated surfaces. Additionally, electrical hazards might be present if powered equipment (e.g., a powered pressure washer) is used. If a power washer is used, units will be operated in accordance with the manufacturer's operating instructions and personnel will wear appropriate PPE to prevent high-pressure spray injuries (as spelled out in a JSA).

2.3.14 Dust

Work shall be performed to minimize the creation of dust. This shall be accomplished by use of water trucks, water from available hose bibs, and by visual observation of dust generation. The amount of water used shall be controlled to prevent the generation of free-flowing water on the ground or landfill surface. Health and safety and RadCon personnel shall monitor the wind and other weather conditions to ensure that measures are taken proactively to control dust, as needed.

2.4 Environmental Hazards and Mitigation

This section describes environmental hazards and states the procedures and work practices that will be followed to mitigate them.

2.4.1 Noise

Personnel performing ICDF operations activities might be exposed to high noise levels from heavy equipment, trucks, hand tools, and compressors. Where noise levels are suspected of exceeding 80 decibel A-weighted (dBA), noise monitoring will be performed to determine if personnel are routinely exposed to noise levels in excess of the exposure limit (84 dBA for a 10-hour time-weighted average [TWA]). Personnel whose noise exposure routinely meets or exceeds the allowable TWA will be enrolled in their employer's hearing conservation program. Personnel working on jobs that have noise exposures greater than 84 dBA will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by health and safety personnel until directed otherwise.

2.4.2 Temperature and Ultraviolet Light Hazards

The ICDF operational tasks will be conducted year-round during times when there is a potential for both heat and cold stress that could present a potential hazard to personnel. Health and safety personnel will be responsible for obtaining meteorological information to determine if additional heat or cold stress administrative controls are required.

2.4.2.1 Heat Stress. High ambient air temperatures can result in increased body temperature that can lead to symptoms ranging from physical discomfort, unconsciousness, to death. In addition, tasks requiring the use of protective equipment or respiratory protection prevent the body from cooling. Personnel working in high heat environments will be trained to recognize the signs and symptoms of heat-related illnesses (heat rash, heat cramps, heat exhaustion, and heat stroke). Training will also include techniques to prevent heat-related illness (rest breaks, fluid consumption, work rate adjustments, acclimatization, etc.).

<p>NOTE: Heat stroke is an extremely serious condition that can result in death and should be treated as such. The ICDF personnel should immediately request an ambulance (777 or 526-1515) be dispatched from the Central Facilities Area (CFA) -1612 medical facility and the individual cooled as quickly as possible using ice packs, water, or other means.</p>

A supply of cool drinking water will be provided in designated eating areas and consumed only in these areas. The ICDF personnel may periodically be interviewed by health and safety personnel to ensure that the controls are effective and that excessive heat exposure is not occurring. Workers will be encouraged to monitor their body signs and to take breaks if symptoms of heat stress occur.

2.4.2.2 Low Temperatures and Cold Stress. For outdoor ICDF operations, personnel will be exposed to low temperatures during fall and winter months or at other times of the year if relatively cool ambient temperatures combined with wet or windy conditions exist. Personnel will dress appropriately for the weather and take warm-up breaks as needed. Additional cold weather hazards may exist from working on snow- or ice-covered surfaces. Slip, fall, and material-handling hazards are increased under these conditions. Every effort must be made to ensure walking surfaces are kept clear of ice.

2.4.2.3 Ultraviolet Light Exposure. Personnel will be exposed to ultraviolet (UV) light when conducting ICDF operations outdoors. Sunlight is the main source of UV known to damage the skin and to cause skin cancer. The amount of UV exposure depends on the strength of the light, the length of

exposure, and whether the skin is protected. Workers should protect their skin with sun block and/or clothing.

2.4.3 Confined Spaces

Work in confined spaces could subject personnel to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres. Confined spaces at the ICDF are evaluated to determine the specific hazards associated with each space. If a potential hazard is present, a permit will be required prior to entry. Personnel who enter confined spaces must also receive specific confined space entry training. All entries will be performed in accordance with the requirements in PRD-2110, “Confined Spaces.”

2.4.4 Working on and near Water

The potential for a drowning hazard exists if a person were to fall into one of the evaporation ponds and become unconscious, be rendered unable to function, or cannot swim. Each person working on the slope of a pond containing at least 2 ft of liquid in the area where work is being performed must wear a personal flotation device suitable for the intended purpose. The buddy system shall be implemented for all work being performed on the slopes of the evaporation ponds. A ring buoy (throw ring) shall also be provided and be readily available for emergency rescue operations.

2.4.5 Biological Hazards

The ICDF Complex is located in an area that provides habitat for various rodents, insects, and vectors (i.e., organisms that carry disease-causing microorganisms from one host to another). The hantavirus could be present in the nesting and fecal matter of deer mice. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. If suspected rodent nesting or excrement material is encountered, health and safety personnel will be notified immediately and **no attempt will be made to remove or clean the area**. Following an evaluation of the area, disinfection and removal of such material will be conducted in accordance with applicable protective controls.

Snakes, insects, and arachnids (e.g., spiders and ticks) also may be encountered at the ICDF. Common areas to avoid include material stacking and staging areas, under existing structures (e.g., trailers and buildings), under boxes, and other areas that provide shelter. Protective clothing will generally prevent insects from direct contact with the skin. If potentially dangerous snakes or spiders are found or are suspected of being present, warn others, keep clear, and contact health and safety personnel for additional guidance, as required.

2.4.6 Inclement Weather Conditions

When inclement or adverse weather conditions develop that could pose a threat to persons or property at the ICDF area (e.g., sustained strong winds, electrical storms, heavy precipitation, or extreme heat or cold), these conditions will be evaluated and a decision made by ICDF management, health and safety, and RadCon personnel to stop work, employ compensatory measures, or proceed.

2.5 Other ICDF Hazards

The ICDF personnel should continually look for potential hazards and immediately inform supervision or health and safety personnel of the hazards so that action can be taken to correct the condition. All personnel have the authority to initiate STOP WORK actions if it is perceived that an

imminent safety or health hazard exists, or take corrective actions within the scope of the work control documents to correct minor safety or health hazards and then inform supervision.

2.6 Site Inspections

The ICDF health and safety, RadCon, and supervisory personnel may conduct self-assessments or other inspections. Contract oversight personnel also may perform inspections and assessments of the subcontractors' activities. All inspections and assessments will be documented and available for review by ICDF management and oversight personnel.

3. EXPOSURE MONITORING AND SAMPLING

Monitoring and sampling will be used during project tasks to (1) assess the effectiveness of controls, (2) determine the type of PPE needed for individual tasks, (3) determine personnel exposures, and (4) determine the need for upgrading and downgrading of PPE as described in Section 5. Health and safety and RadCon personnel will perform monitoring and/or sampling as deemed appropriate in accordance with applicable procedures, OSHA substance-specific standards, and other requirements. All nonradiological air sampling will be conducted using applicable National Institute of Occupational Safety and Health (NIOSH), OSHA, or other validated method. All radiological monitoring will be performed in accordance with applicable RadCon manuals. Instrumentation will be selected based on the site-specific conditions and contaminants associated with project tasks. Health and safety and RadCon personnel will be responsible for determining the best monitoring technique for chemical, physical and radiological contaminants.

3.1 Action Limits

Action limits have been established for ICDF operations and are identified in Table 3-1. Monitoring results at or above an action limit will initiate additional evaluations, including consideration for improved engineering controls, administrative controls, reevaluation of PPE, and probable need for additional exposure monitoring based on health and safety lead recommendations. Action limits may be adjusted based on changing site conditions, exposure mitigation practices, and PPE levels.

3.2 Instrument Calibration and Maintenance

All sampling and monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations and in compliance with applicable procedures. Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded as stated in Section 12.

Daily operational and periodic source checks will be performed on instruments in use to ensure they are functioning properly. Accountable radioactive sources will be maintained in accordance with applicable policies and procedures. Radiological instrumentation will be maintained and calibrated in accordance with existing RadCon protocol and with applicable manuals, policies, and procedures.

3.3 Personnel Radiological Exposure Monitoring

Personal exposure monitoring will be conducted during ICDF operational activities to quantify radiation exposure. This includes the use of external dosimetry, airborne radioactivity monitoring, and internal monitoring methods as appropriate.

3.3.1 External Dosimetry

Dosimetry requirements will be based on the radiation exposure potential during ICDF operations. When dosimetry is required, all personnel who enter ICDF operational areas will be required to wear personal dosimetry devices, as specified by RadCon personnel and the RWP and in accordance with applicable RadCon manuals.

Table 3-1. Action levels and associated responses for ICDF operational hazards.

Contaminant/Agent Monitored	Action Level	Response Taken if Action Levels are Exceeded
Nuisance particulates (not otherwise classified)	>10 mg/m ³ (inhalable fraction) >3 mg/m ³ (respirable fraction)	<ol style="list-style-type: none"> 1. Move personnel to upwind position of source and close equipment cab windows and doors. 2. Use wetting or misting methods to minimize dust and particulate matter. 3. <u>IF</u> wetting or misting methods prove ineffective, <u>THEN</u> don respiratory protection^a (as directed by health and safety lead).
Chemical airborne contaminant	Based on one-half or 50% of the most conservative individual contaminant exposure limit (TLV or PEL) and OSHA 29 CFR 1910 or 1926 substance-specific requirements.	<ol style="list-style-type: none"> 1. Verify engineering control operation. 2. Reposition personnel to upwind position of source (close equipment cab windows/doors as applicable). 3. Use alternative methods to minimize source airborne generation. 4. <u>IF</u> engineering and administrative controls do not control contaminant below exposure limit, <u>THEN</u> reevaluate engineering/administrative controls or don respiratory protection^a (as directed by health and safety lead).
Hazardous atmosphere	Based on one-half or 50% of the individual contaminant exposure limit. NOTE: <i>Work in confined spaces may require action limits less than 50% of exposure limit (lower exposure limit, oxygen content, etc.). Consult with health and safety lead.</i>	<ol style="list-style-type: none"> 1. Measure atmosphere prior to initiating operation and verify specific limit or condition has been met. 2. Utilize engineering controls to maintain safe atmosphere below specified limit. 3. <u>IF</u> engineering controls fail to control contaminant below safe atmospheric/exposure limit, <u>THEN</u> stop operation and evacuate personnel until safe atmosphere/specified limit can be achieved.

Table 3-1. (continued).

Contaminant/Agent Monitored	Action Level	Response Taken if Action Levels are Exceeded
Hazardous noise levels	<84 dBA 10-hour TWA	No action.
	84 to 98 dBA 10-hour TWA	Implement engineering and administrative controls, as feasible. Hearing protection is required to attenuate hazard to below 84 dBA for 10-hour TWA. All exposed personnel shall be enrolled in hearing conservation program.
	>98 dBA 10-hr TWA	Evaluate engineering and administrative controls. Evaluate noise reduction rating for single device, double protection as needed.
	>140 dBC	Control entry and isolate source. No exposures of an unprotected ear shall be permitted. Evaluate noise reduction rating for double protection—might not be adequate.
Radiation field Radiological contamination Airborne radioactivity	Levels and limits as specified in PRD-183, “Radiological Control Manual.”	Area designations and postings as specified in PRD-183, “Radiological Control Manual.”
a. Level C respiratory protection will consist of a half- or full-face respirator equipped with an air filter cartridge as prescribed by the health and safety lead or RadCon personnel (based on contaminant of concern). CFR = <i>Code of Federal Regulations</i> dBA = decibel A-weighted dBC = decibel C-weighted OSHA = Occupational Safety and Health Administration PEL = permissible exposure limit PRD = program requirements document TLV = threshold limit value TWA = time-weighted average		

When RWPs are required for ICDF operations, the Radiological Control and Information Management System will be utilized to track external radiation exposures to ICDF personnel. Individuals are responsible for ensuring that all required personal information is provided to RadCon personnel for entry into the Radiological Control and Information Management System and logging in when electronic dosimeters are used.

3.3.2 Internal Monitoring

The purpose of internal dose monitoring is to demonstrate compliance with 10 CFR 835, “Occupational Radiation Protection.” The requirement for whole body counts and bioassays will be based on specific ICDF operations or activities and will be the determination of the radiological engineer (RE). If the RE deems bioassays appropriate, requirements will be specified on the RWP, and ICDF personnel will be responsible for submitting required bioassay samples upon request. A bioassay baseline may be required for ICDF personnel that have a previous history working at radiological or hazardous waste facilities.

4. ACCIDENT AND EXPOSURE PREVENTION

The ICDF operations will present numerous safety, physical, chemical, and radiological hazards to operations personnel. The ICDF engineering controls, hazard isolation, specialized work practices, and the use of PPE will be implemented to eliminate or mitigate potential hazards and exposures where feasible. However, all personnel are responsible for the identification and control of hazards in their respective operational work areas in accordance with Integrated Safety Management System (ISMS) principles and practices. **Hazards shall not be left unmitigated without implementing some manner of controls or abatement (e.g., engineering controls, administrative controls, or the use of PPE).** The ICDF personnel should use STOP WORK authority where it is perceived that imminent danger to personnel, equipment, or the environment exists.

4.1 Voluntary Protection Program and Integrated Safety Management

The INEEL safety processes embrace the Voluntary Protection Program (VPP) and ISMS criteria, principles, and concepts to identify and mitigate hazards, thereby preventing accidents. All management and workers are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. The ICDF operations personnel are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents, procedures, and permits.

The **ISMS** is focused on the **system** side of conducting operations and **VPP** concentrates on the **people** aspect of conducting work. Both programs define work scope, identify and analyze hazards, and mitigate the hazards. (Additional information on these programs is available on the INEEL Intranet.) The M&O contractor and its subcontractors participate in VPP and ISMS. This HASP includes all elements of both systems. The five key elements of VPP and ISMS and their corresponding HASP sections are as follows:

Voluntary Protection Program	Integrated Safety Management System	Health and Safety Plan Section
Work site analysis	Define work scope	Section 1
	Analyze hazards	Sections 2, 3, 5, and 8
Hazard prevention and control	Develop and implement controls	Sections 2, 3, 4, 5, 7, 10, and 11
Safety and health training	Perform work within controls	Section 6
Employee involvement		Sections 2, 3, and 4
Management leadership	Provide feedback and improvement	Sections 6 and 9

4.2 General Safe-Work Practices

The following practices are mandatory for all ICDF operations personnel to further reduce the likelihood of accidents and injuries. Failure to follow these practices may result in disciplinary actions or permanent removal from the ICDF.

- Limit access to ICDF operations areas to authorized personnel only.

- All ICDF personnel shall have the authority to initiate STOP WORK actions.
- The ICDF personnel shall not eat, drink, chew gum or tobacco, smoke, apply cosmetics/sunscreen, or perform any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials within the fenced area of the ICDF. Designated areas may be identified at the discretion of the ICDF management.
- Be aware of and comply with all safety signs, tags, and barriers.
- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and spills that may be present. Report all potentially dangerous situations to the ICDF facility manager, operations superintendent, and/or health and safety lead.
- Avoid direct contact with ICDF waste material. Personnel shall not walk through spills or other areas of contamination and shall avoid kneeling, leaning, or sitting on equipment or surfaces that may be contaminated with waste.
- Be familiar with the physical characteristics of the ICDF, including, but not limited to:
 - Prevailing wind direction(s)
 - Accessibility of fellow personnel, equipment, and vehicles
 - ICDF operations areas and the type of waste stored or disposed of there
 - Major roads and means of access to and from the ICDF
 - Nearest water sources and fire fighting equipment
 - Warning devices and alarms
 - Capabilities and location of nearest emergency assistance.
- Report all broken skin or open wounds to the radiological control technician (RCT) or health and safety lead. The RadCon supervisor will determine whether the wound can be bandaged adequately for subsequent entry into a radiological contamination area in accordance with applicable RadCon manuals.

4.3 Radiological Exposure Prevention—As Low As Reasonably Achievable Principles

Radiation exposure of ICDF operations personnel will be controlled such that exposures are well below regulatory limits and that there is no radiation exposure without commensurate benefit. **Unplanned and preventable exposures are considered unacceptable.** All ICDF operations will be evaluated with the goal of eliminating or minimizing exposures to levels that are ALARA. All ICDF personnel have the responsibility for following ALARA principles and practices, and personnel working at the ICDF must strive to keep both external and internal radiation doses ALARA by adopting the following practices in the following sections. Dose rate estimates for ICDF operations are identified in EDF-ER-327, “INEEL CERCLA Disposal Facility Short-Term Risk Assessment.”

NOTE: *The radiological department shall establish work controls, both initially and as an ongoing activity, throughout ICDF operations. These work control efforts will ensure that workers are adequately protected from known sources of radiation in ICDF operations areas. The issuance of RWPs, establishment and posting of RCAs, and review of higher risk/exposure potential ICDF operational activities by the Balance of INEEL Cleanup ALARA committee will form the basis for controlling exposure to ionizing radiation during ICDF operations.*

4.3.1 External Radiation Dose Reduction

The RWP will be written (as required) for ICDF operational activities and will define hold points, required dosimetry, RCT coverage, and radiological limiting conditions in accordance with applicable policies and procedures. The RadCon personnel will participate in the prejob briefing to ensure that personnel understand the anticipated radiological conditions to be encountered and the limiting conditions on the RWP. All personnel will be required to read and acknowledge the RWP requirements before being allowed to sign the RWP (or scan the RWP bar code) and obtain electronic dosimetry.

Basic measures used to reduce external doses include (1) minimizing time in radiation areas, (2) maximizing the distance from known sources of radiation, and (3) using shielding whenever possible. The following are methods to minimize external doses.

Methods for minimizing time include the following:

- Plan and discuss the tasks before entering a radiation area (including having all equipment and tools prepared)
- Perform as much work as possible outside radiation areas and take advantage of lower dose rate areas (as shown on the radiological survey maps)
- Take the most direct route to the tasks and work efficiently
- If problems occur in the radiation areas, hold technical discussions outside radiation areas, then return to the work area to complete the task
- If stay times are required, know your stay time and use appropriate signal and communication methods to let others in the area know when the stay time is up
- Respond to electronic dosimetry alarms by notifying others in the area and the RCT, and exit the radiation area through the designated entry and exit point
- Know your current dose and your dose limit—DO NOT EXCEED YOUR DOSE LIMIT.

Methods for maximizing distance from sources of radiation include the following:

- Use remote-operated equipment or controls where required
- Stay as far away from the source of radiation as possible (extremely important for point sources where, in general, if the distance between the source is doubled, the dose rate falls to one-fourth of the original dose rate)
- Become familiar with the radiological survey map for the area in which work will be performed, as well as high and low dose rate locations, and take advantage of low dose rate areas.

Proper use of shielding includes the following:

- Know what shielding is required and how it is to be used for each radiation source
- Take advantage of the equipment and enclosures for shielding yourself from radiation sources
- Wear safety glasses to protect eyes from beta radiation.

4.3.2 Internal Radiation Dose Reduction

Reducing the possibility for radioactive material to enter the body is key to controlling internal dose. The following are methods to minimize internal radiation dose:

- Know the potential and known ICDF contamination sources and locations, and minimize or avoid activities in those areas
- Wear protective clothing and respiratory protection as identified on the RWP, perform all respirator leak checks, and inspect all PPE before entering contaminated areas or areas with airborne radioactivity
- Use a high-efficiency particulate air filter exhaust system
- When inside contaminated areas, do not touch your face (adjust glasses or PPE) or other exposed skin
- When exiting contaminated areas, follow all posted instructions and remove PPE in the order prescribed (if questions arise, consult RadCon personnel)
- Conduct whole body personnel survey when exiting the contaminated area, then proceed directly to the personnel contamination monitor
- Report all wounds or cuts (including scratches and scrapes) before entering radiologically contaminated areas
- Wash hands and face before eating, drinking, smoking, or engaging in other activities that may provide a pathway for contaminants.

4.3.3 Chemical and Physical Hazard Exposure Avoidance

The ICDF will receive low-level, mixed low-level, hazardous, and TSCA remediation waste. Most of the waste designated for ICDF disposal will be contaminated soil, but debris and CERCLA investigation-derived waste are also included in the waste inventory.

The primary potential for exposure during ICDF operations will be from chemicals brought to the ICDF Complex in support of operational activities and from waste handling and disposal operations. The ICDF operations personnel will be required to have a material safety data sheet for all chemicals used at the ICDF in accordance with applicable policies and procedures.

Threshold limit values (TLVs), or other occupational exposure limits, have been established for numerous chemicals and physical agents that could be encountered. These exposure limits provide guidelines in evaluating airborne, skin, and physical agent exposures. The TLVs represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects.

Controls will be employed during ICDF operations to eliminate or mitigate chemical and physical hazards wherever feasible. The hierarchy of controls in order are (1) engineering controls, (2) administrative controls, and (3) PPE. In addition to these controls, use of technical procedures and work orders, hold points, training, and monitoring of hazards will be used as appropriate to reduce exposure potential. Some methods of exposure avoidance include the following:

- Wearing all required PPE, inspecting all pieces before donning, and taping all seams
- Changing PPE if it becomes damaged or shows signs of degrading
- Minimizing time in direct contact with hazardous material or waste
- Doffing PPE in accordance with standard practices and following doffing sequence

- Washing hands and face before eating, drinking, smoking, or engaging in other activities that could provide a pathway for contaminants.

4.4 Buddy System

The two-person or “buddy system” may be used during some ICDF operations. The buddy system is most often used during operational activities requiring the use of protective clothing and respiratory protection where heat stress and other hazards could impede a person’s ability to self-rescue or in immediately dangerous to life or health (IDLH) situations. The buddy system requires each employee to assess and monitor his or her buddy’s mental and physical well-being during the course of the operation. A buddy must be able to perform the following activities:

- Provide assistance if required
- Verify the integrity of PPE
- Observe his or her buddy for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the area if emergency assistance is needed.

The HSO in conjunction with the facility manager and RadCon personnel will determine the need to use the buddy system during operations.

5. PERSONAL PROTECTIVE EQUIPMENT

This section provides guidance for the selection and use of PPE to be worn for ICDF operations and contingencies for upgrading/downgrading PPE. The actual PPE requirement for specific ICDF operations and maintenance tasks will be specified in applicable JSAs, operating procedures, work packages, SWPs, or RWP.

The purpose of PPE is to shield or isolate personnel from radiological, chemical, physical, and/or biological hazards that cannot be eliminated through engineering or other controls. It is important to realize that no one PPE ensemble can protect against all hazards under all conditions and that proper work practices and adequate training will serve to augment PPE to provide the greatest level of protection to workers.

Selection of the proper PPE to protect facility personnel is based on the following:

- Specific conditions and nature of the tasks
- Potential contaminant routes of entry
- Physical form and chemical characteristics of ICDF chemicals or waste contaminants
- Acute and chronic effects from exposure to ICDF chemicals or waste contaminants
- Local and systemic toxicity of ICDF chemicals or waste contaminants
- Potential exposure levels (surface and airborne).

The PPE is generally divided into two broad categories: (1) respiratory protective equipment and (2) personal protective clothing. The ICDF operations will be evaluated to determine the most appropriate PPE levels and any modifications required. Potential exposures and hazards associated with ICDF operations will be monitored (as discussed in Section 3) during the course of the project to evaluate changing conditions and to determine PPE level adequacy and modifications.

5.1 Respiratory Protection

The primary objective will be to prevent atmospheric contamination in the control of those occupational diseases caused by breathing air that is contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, airborne radioactive materials, sprays, or vapors. This will be accomplished as far as feasible by accepted engineering control measures (e.g., enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be selected and used.

It is anticipated that respiratory protection will not be required during ICDF operations. Exposures are expected to remain below the established action limits. If it becomes necessary to use respiratory protection, all personnel required to wear a respirator shall complete a health examination and applicable training and be fit-tested before being assigned a respirator.

5.2 Personal Protective Equipment Levels

The following sections provide general guidance on typical hazardous waste operations and emergency response (HAZWOPER) levels of PPE. ICDF operational activities will be evaluated to determine the most appropriate PPE that may or may not incorporate traditional HAZWOPER levels. When it is necessary to wear personal protective equipment, PPE requirements will be specified on applicable operational JSAs.

Personnel must inspect all PPE before donning and entry into any work area. Items found to be defective or that become unserviceable during use will be doffed and disposed of in the appropriate waste stream.

For all ICDF operations, the minimum PPE requirements will include hard hat, safety glasses with side shields, sturdy above-the-ankle leather boots, and high-visibility clothing (vests).

5.2.1 Level D Personal Protective Equipment

Level D PPE will only be selected for protective clothing and not for ICDF operations with respiratory or skin absorption hazards requiring whole-body protection. Level D PPE provides no protection against airborne chemical hazards, but rather is used for protection against surface contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized as having limited contamination hazards.

5.2.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site (chemical or radiological) contaminants have been well characterized, indicating that personnel are protected from airborne exposures by wearing an air-purifying respirator with the appropriate cartridges, no oxygen-deficient environments exist (less than 19.5% at sea level), and that there are no conditions that pose immediate danger to life or health.

5.2.3 Level B Personal Protective Equipment

Level B PPE will be worn when personnel cannot be adequately protected with an air-purifying respirator because there are high levels of contaminants present, the appropriate respirator cartridges or combination is not available, a significant hazard exists for skin exposure, or IDLH or oxygen-deficient conditions exist. If IDLH conditions do not exist, then an escape air-purifying cartridge may be substituted for the escape bottle.

5.2.4 Level A Personal Protective Equipment

Level A PPE is not anticipated for ICDF operations.

5.3 Personal Protective Clothing Upgrading and Downgrading

The ICDF HSO, in consultation with RadCon personnel, will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading PPE based on changing operational conditions (e.g., equipment, waste types, location of tasks) is a normal occurrence. If changing conditions are encountered, work control documents (e.g., work order, RWP, JSA) may need to be updated to reflect these changes or augmented by an SWP. Additional reasons for upgrading or downgrading are listed in the following subsections.

Addition or revision of the type and number of layers of gloves and shoe covers is not considered an upgrade or downgrade of PPE and can be made at the discretion of the HSO or RadCon personnel (as long as the change is within the requirements of the RadCon manual). If additional layers of anti-contamination clothing are desired, the change should be reviewed by the HSO to ensure that no heat stress issues are created.

5.3.1 Upgrading Criteria for Personal Protective Equipment

The level of PPE required will be upgraded as needed upon evaluation of the following conditions. When these conditions occur, work will halt until PPE upgrading has been evaluated and implemented as required:

- Identification of new, unstable, or unpredictable site hazards
- Temporary loss or failure of any engineering controls
- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Identified source or potential source of respiratory hazard(s) not anticipated
- Change in the task procedure that could result in an increased contact with contaminants.

5.3.2 Downgrading Criteria

The level of PPE will be downgraded as appropriate upon evaluation of the following conditions:

- Elimination of hazard or completion of task(s) requiring specific PPE
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate the hazard
- Sampling information or monitoring data that show the contaminant levels to be stable and lower than established action limits.

5.4 Inspection of Personal Protective Equipment

During operations, all PPE ensemble components must be inspected before and during use during ICDF operations. If PPE should become damaged or degradation or permeation is suspected, the individual wearing the PPE will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable PPE. In addition, all PPE that becomes grossly contaminated or presents a potential source for the spread of such contamination will be required to be decontaminated or replaced.

Where specialized protective clothing or respiratory protection is used or required, the manufacturer's inspection requirements in conjunction with regulatory or industry inspection practices will be followed. Consult the HSO and RadCon personnel about specific PPE inspection criteria.

6. PERSONNEL TRAINING

All ICDF personnel will receive training, as specified in the 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response,” standard; the ICDF Implementation Subcontract; federal and state regulations; and INEEL manuals, as applicable. All ICDF training will be developed, conducted, and maintained in accordance with applicable INEEL manuals and the ICDF Implementation Subcontract. The ICDF subcontractor(s) will provide their own training implementation documentation and records management process.

6.1 Training Methods

Training settings and methods are carefully selected to optimize the trainee’s learning experiences. They may include classroom, web-based instruction, self-study, and on-the-job training, as appropriate.

6.2 Implementation of Training

The subcontractor facility manager is responsible for ensuring that crafts and maintenance personnel assigned to work at the ICDF have the skills necessary for their particular craft.

Radiological control personnel assigned to work at the ICDF participate in an ongoing training program in accordance with 10 CFR 835, but will be given ICDF-specific training as well.

The ICDF Implementation Subcontractor is responsible for ensuring that personnel have an adequate level of facility knowledge, including a general overview of the facility, facility-specific hazards, safety, and applicable procedures. In addition, job supervisors will be required to communicate lessons learned to operations personnel at prejob briefings.

The ICDF operations subcontractor has developed a training matrix that details the required training for each position, including visitors and oversight personnel. The M&O contractor may develop additional criteria in their employees’ individual training plans. Table 6-1 lists the minimum requirements for personnel at the ICDF, regardless of employer. Position-specific training not listed in Table 6-1 (fall protection, fire watch, lockout/tagout, ladder safety, etc.) is found in the ICDF operations subcontractor’s training matrix.

Table 6-1. The ICDF operations minimum required training.

Subject	Frequency	Target Audience
40-Hour HAZWOPER	Initial	All ICDF personnel engaged in activities that expose or potentially expose them to hazardous substances and health hazards. This training also requires 3 days of supervised field experience.
24-Hour HAZWOPER	Initial	<i>Occasional</i> site workers performing limited tasks and who are unlikely to be exposed above published exposure limits. This training also requires 1 day of supervised field experience.
HAZWOPER 8-Hour Refresher	Annual	All 40-hour and 24-hour HAZWOPER workers and supervisors.
8-Hour HAZWOPER Supervisor	Initial	On-Site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations.

Table 6-1. (continued).

Subject	Frequency	Target Audience
INEEL Site Access OR INEEL Site Access for Construction Workers	Initial, Annual for Construction Workers	All employees requiring access to controlled facilities at the INEEL. Subcontractors will receive INEEL Site Access Training for Construction Workers (orange card).
INEEL General Employee Radiological Training	2 years	All personnel who routinely enter a controlled area and encounter radiological barriers, postings, or radioactive materials
Radiological Worker I	2 years	All personnel requiring unescorted access into a radiological buffer area, radiation area, high or very high radiation area, and some radioactive materials areas. NOTE: Rad I trained personnel are NOT qualified to enter contamination, high contamination, and soil contamination areas and may not perform work involving contaminated material in an radiological buffer area or radiation area.
Radiological Worker II	2 years	Required for personnel whose job assignment involves entry into contamination and/or airborne radioactivity areas in addition to radiological buffer areas and all types of radiation areas.
Area Warden	Initial	Subcontractor facility manager and at least one alternate
Hazard Communication	Initial	All ICDF employees
PPE Use Training	Initial	All ICDF employees
First Aid/CPR	2 years	At least one first aid/CPR trained individual shall be available at all times while work is being performed.
Hazardous Materials Transportation—General Awareness	3 years	All personnel who in the course of employment directly affect hazardous materials transportation safety. This includes the roles and tasks for a hazardous material employee as defined in 49 CFR 171.
Hazardous Materials Transportation—Driver Training	3 years	All drivers operating a commercial motor vehicle to transport hazardous materials.
ICDF HASP	Initial	All ICDF employees. Visitors will receive a condensed HASP briefing and be escorted while at the ICDF.
CFR = <i>Code of Federal Regulations</i> CPR = cardiopulmonary resuscitation HASP = health and safety plan HAZWOPER = hazardous waste operations and emergency response ICDF = INEEL CERCLA Disposal Facility INEEL = Idaho National Engineering and Environmental Laboratory PPE = personal protective equipment		

The ICDF operations personnel shall complete the necessary training as identified in the training matrix and this HASP before beginning their assigned activities. All training shall be conducted by qualified instructors or subject-matter experts.

6.3 Training Records

Training records for subcontract ICDF personnel will be kept in accordance with PRD-5001, "Training and Indoctrination." Employee experience and employment history records are maintained by Human Resources in personnel files or by the subcontractor for their employees.

6.4 Prejob/Postjob Briefings and Safety Meetings

All ICDF operational activities will require a prejob briefing conducted by a supervisor. During this briefing, tasks associated with ICDF operations will be outlined, hazards identified, hazard controls/mitigations reviewed, PPE requirements discussed, waste minimization opportunities communicated, and employees' questions answered. Following the completion of operational activities (first performance of new routine operations and after performance of nonroutine operations), a postjob briefing will be conducted with particular emphasis on capturing lessons learned and process improvement for future operations.

Other safety meetings on various subjects will be conducted periodically for personnel to reinforce specific safety topics. The ICDF HSO, a supervisor, or other personnel may conduct safety meetings. Attendance at the safety meetings will be documented on an applicable form and submitted to training personnel for entry into TRAIN, as required.

The ICDF personnel will be trained on the hazards and mitigation measures for conducting the work in accordance with policies and procedures. This will include training to applicable operating procedures, work packages, JSAs, RWPs, SWPs, and other associated permits or facility-specific training. All training will be conducted by a qualified instructor, field supervisor, HSO, and others (as appropriate) based on the nature of the training, and the training will be documented in accordance with company/subcontract policies and procedures.

7. SITE CONTROL AND SECURITY

The ICDF Complex is fenced and controlled to prevent unauthorized entry into operations areas. Personnel not directly involved with ICDF operations shall be excluded from entering the ICDF operations area. Visitors may be authorized to enter the established ICDF operations area, provided they are conducting official business and have met all the ICDF facility-specific training requirements for the area.

7.1 Radiological Control and Release of Materials

If ICDF equipment or materials become potentially radiologically contaminated, they will not be released until required radiological surveys have been completed (e.g., hand-held instruments and swipes) in accordance with applicable RadCon policies and procedures, as stated in the RWP, and as directed by RadCon personnel.

7.2 Site Security

The ICDF is secured and controlled with the existing fence and through appropriate posting to prevent entry into ICDF operational areas.

NOTE: <i>Signs are routinely lost because of high winds and will be replaced as soon as possible the next working day following discovery.</i>

7.3 Wash Facilities and Designated Eating Areas

The ICDF operations (such as waste transportation, handling, storage, and disposal) will involve close, if not direct, contact with waste. Ingestion of hazardous substances is likely when workers do not practice good personal hygiene habits during and following activities in the operations areas of the ICDF. No eating, drinking, smoking, chewing gum or tobacco, applying cosmetics, lip balm, or sunscreen is permitted within the fenced area of the ICDF, except in designated areas. It is important to wash hands, face, and other exposed skin areas thoroughly after completion of work and before eating.

7.4 Smoking Area

Smoking will only be permitted within designated areas only. Personnel will comply with all INEEL smoking policies, including disposal of smoking materials in the proper receptacles.

8. OCCUPATIONAL MEDICAL SURVEILLANCE

The ICDF personnel will participate in an occupational medical surveillance program when required by DOE Order 440.1A, “Worker Protection Management for DOE Federal and Contractor Employees,” and/or 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response.” When required, medical surveillance examinations will be provided before assignment, annually, and after termination of HAZWOPER duties or employment. This includes:

- Personnel who are, or may be, exposed to hazardous substances at or above the OSHA permissible exposure limit (PEL), or published exposure limits, without regard to respirator use for 30 or more days per year
- All employees who are injured, become ill, or develop signs or symptoms because of possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation
- All employees who wear a respirator for 30 days or more a year

Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in a medical evaluation program for respirator use at least annually.

NOTE: <i>Exposure levels in excess of permissible exposure limits and use of respiratory protection for more than 30 days per year are not anticipated for ICDF operations and maintenance activities.</i>

A copy of the project HASP, job hazard analysis requirements, required PPE, and exposure-related monitoring and sampling information will be made available, upon request, to the physician conducting medical surveillance for employees participating in this project.

When required, a documented medical clearance (e.g., a physician’s written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him or her at increased risk of health impairment from working in hazardous waste operations, emergency response operations, respirator use areas, and confined space areas, as applicable. The physician may impose restrictions on the employee by limiting the amount and type of work performed.

Medical data from the subcontractor employee’s private physician, collected pursuant to hazardous material worker qualification, shall be made available to the INEEL Occupational Medical Program (OMP) physicians, upon request. A subcontractor employee’s past radiation exposure history may be requested and, if so, will be submitted to the M&O contractor’s radiation dosimetry and records section in accordance with applicable policies, manuals, and procedures.

Personnel are responsible for communicating any work or medical restrictions to their supervisor so modified work assignments can be made if necessary. During the prejob briefing, the supervisor conducting the briefing should ask workers if they have any work restrictions. However, it is the employees’ responsibility to inform the supervisor of any work or medical restrictions.

8.1 Injuries at the ICDF

All work-related injuries and illnesses shall be reported to the ICDF HSO and facility manager as soon as possible after the event occurs. If the injury or illness involves radiological exposure, or occurred in a radiological area, the RadCon supervisor shall also be notified.

Personnel shall be examined by a physician (OMP physician or subcontractor's private physician) for the following reasons:

- An employee is injured on the job
- An employee is experiencing signs and symptoms consistent with exposure to a hazardous material
- An employee is believed to have been exposed to toxic substances or physical or radiological agents in excess of allowable limits during the course of a project at the INEEL.

In the event of an illness or injury, the decision to provide first aid and transport to the nearest medical facility, or whether to immediately request an ambulance and continue to stabilize and provide first aid, should be based on the nature of the injury or illness and the likelihood that transporting the individual could cause further injury or harm. Most likely, the person making this decision will only be trained to the first aid/CPR level and should contact the CFA medical facility at 777 or 526-1515 for further guidance if there is any question as to the extent of injury or potential to cause further harm by movement of the injured individual.

NOTE: *The M&O contractor employees will be transported to the CFA medical facility (CFA-1612). Subcontractors may choose whether to use their own private physician or transport the victim to the CFA medical facility. For medical emergencies, the patient will be transported by INEEL ambulance to the medical facility and/or to have an injury stabilized before transport to the subcontractor's treating physician or off-Site medical facility.*

The employee's supervisor, with assistance from the HSO and/or RadCon personnel, is responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work location, and supervisor's name and phone number
- Substance, physical or radiological agent exposed to (known or suspected), and material safety data sheet, if available
- Nature of the incident and injury or exposure and associated signs or symptoms of exposure
- First aid or other measures taken
- Locations, dates, and results of any relevant personal or area exposure monitoring or sampling
- List of PPE worn during this work (e.g., type of respirator and cartridge used).

Further medical evaluation will be determined by the treating or examining physician in accordance with the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements in compliance with 29 CFR 1910.120 or other substance-specific standards.

The M&O contractor POC and facility manager will be contacted if any injury or illness occurs at the ICDF. As soon as possible after an injured employee has been transported to the INEEL medical facility, the subcontractor facility manager or designee will make notifications as indicated in Section 10.4.1, "Notifications."

The RadCon personnel will evaluate all actual and/or suspected abnormal radiological exposures in excess of allowable limits and will establish the follow-up actions in accordance with applicable RadCon policies and procedures.

Before entry into a contamination control area, the RadCon supervisor, or designee, will examine all wounds (new or existing) to determine the nature and extent of the injury. The RadCon supervisor, or designee (in conjunction with an OMP physician, if necessary), will determine whether the wound can be bandaged adequately for entry into a radiological contamination area in accordance with applicable policies, manuals, and procedures.

8.2 Substance-Specific Medical Surveillance

The ICDF operations will involve the transportation, handling, treatment, and disposal of contaminated soil and debris. Several waste streams making up this total volume contain constituents (organic and inorganic) listed in 29 CFR 1910.1003; have a 29 CFR 1910 Subpart Z, “Toxic and Hazardous Substances,” substance-specific standard; or contain radioisotopes.

All ICDF operations will be evaluated to determine the hazards and potential exposures to operations personnel. The HSO and RadCon personnel will conduct exposure assessments for each operation to determine the potential for exceeding exposure limits.

For operations involving ICDF waste containing chemicals listed in 29 CFR 1910.1003, applicable policies and procedures will be followed. For ICDF waste containing chemicals with substance-specific standards (from 29 CFR 1910, Subpart Z, “Toxic and Hazardous Substances”), substance-specific medical surveillance, training, and work control requirements will apply when required.

All exposures to ionizing radiation will be evaluated in accordance with applicable RadCon policies, manuals, and procedures and, where deemed appropriate, will be controlled through the use of an RWP.

9. ICDF PERSONNEL ROLES AND RESPONSIBILITIES

The sections below outline the responsibilities of key ICDF operations personnel. The emergency organization structure, with both responsibilities and authorities, is contained in the applicable M&O contractor policies and procedures.

9.1 ICDF Complex Management and Operating Contractor Personnel

9.1.1 ICDF Project Manager

The ICDF project manager (PM) shall ensure that all activities conducted at the ICDF Complex comply with (1) applicable company MCPs and PRDs; (2) all applicable OSHA, EPA, DOE, U.S. Department of Transportation (DOT), and State of Idaho requirements; (3) *Implementation Project Management Plan for the Idaho National Engineering and Environmental Laboratory Remediation Program* (LMITCO 1998); (4) the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (DOE-ID 2004); (5) this HASP; and (6) the applicable operations procedures.

The PM is responsible for the overall work scope, schedule, and budget and reporting to affected stakeholders such as DOE-ID and state/federal environmental regulatory agencies. The PM is responsible for (1) developing resource-loaded, time-phased control account plans based on the project technical requirements, budgets, and schedules, and (2) assigning project tasks. The PM coordinates all document preparation, field, laboratory, and modeling activities. The PM will implement the project requirements and ensure that work is performed as planned for the project.

9.1.2 Subject-Matter Experts

These positions are responsible for additional support, as required, during ICDF operations. Subject-matter experts possess the necessary skills, training, and/or education to qualify them to aid in identifying and implementing solutions to problems. These personnel may be either INEEL employees or subcontractors hired for their particular expertise. Some examples of subject-matter experts that will be employed are described in the following subsections.

9.1.2.1 Fire Protection Engineer. The assigned fire protection engineer will support ICDF operations by providing reviews of work packages, conducting preoperational and operational fire hazard assessments (as required), and providing technical guidance to facility personnel regarding all fire protection and life safety issues.

9.1.2.2 Industrial Hygienist. The assigned industrial hygienist provides information regarding hazardous and toxic agents associated with ICDF operations. The industrial hygienist performs oversight of the subcontractor in performance of the following: assesses the potential for worker exposures to hazardous agents according to the subcontract and accepted industry industrial hygienist practices and protocol; participates in task-site characterization and recommends appropriate hazard controls for the protection of task-site personnel; operates and maintains airborne sampling and monitoring equipment; and recommends and assesses the use of PPE required in this HASP (recommending changes as appropriate).

9.1.2.3 Safety Professional. The assigned safety professional performs oversight of the subcontractor in performing the following functions: reviews work packages; observes site activity; assesses compliance with the applicable company manuals; advises operations supervisors and HSO on

required safety equipment; answers questions on safety issues and concerns; and recommends solutions to safety issues and concerns that arise at the task site. The safety professional may also conduct periodic inspections.

9.1.3 Quality Engineer

A quality engineer (QE) provides guidance for facility quality issues, when requested. The QE may periodically observe facility activities and verify that facility operations comply with quality requirements pertaining to these activities. The QE will determine the quality level and will prepare inspection criteria for materials procured in support of the ICDF operations, as required.

9.1.4 ICDF Complex Facility Manager

The ICDF Complex facility manager oversees the ICDF Complex operations and administration to ensure safe and efficient operation of the facility. The facility manager is also responsible for the following:

- Reviewing and approving waste profile documentation, including drafts. The facility manager can accept or reject waste profiles and is responsible for resolving waste profile issues
- Ensuring compliance with the ICDF Complex, ICDF disposal cells, SSSTF, and evaporation pond waste acceptance criteria
- Making ICDF Complex staff assignments and ensuring that ICDF Complex staff is competent, trained, and qualified for assigned work
- Providing oversight for self-assessment and performance monitoring programs for ICDF Complex activities to provide for continuous improvement
- Ensuring that all records generated, maintained, and processed within the ICDF Complex are handled in accordance with DOE, company, and site area records management procedures
- Interfacing with the ICDF project manager to effectively carry out the operational missions of the ICDF Complex.

The ICDF Complex operations subcontractor facility manager performs the above roles and responsibilities as the agent of the M&O contractor facility manager.

9.1.5 Radiological Engineer

The RE is the primary source for information and guidance relative to the evaluation and control of radioactive hazards that might be encountered. The RE provides engineering design criteria and review of contamination controls and makes recommendations to minimize radiological health and safety risks to facility personnel as required and as deemed appropriate by the INTEC RadCon organization.

9.1.5.1 Radiological Control Technician. The assigned RCT is the primary source for information and guidance on radiological hazards that may be encountered during ICDF operations. Responsibilities of the RCT include:

- Radiological surveying of the facility, equipment, and samples
- Providing guidance for radioactive decontamination of equipment and personnel (as required)

- Accompanying contaminated personnel to the nearest INEEL medical facility for evaluation if significant radionuclide contamination occurs.

The RCT must notify the RadCon foreman and the facility manager of any radiological occurrence that must be reported as directed by the applicable company manuals. The RCT may have other duties at the facility, as specified in other sections of this HASP or in applicable PRDs and/or MCPs.

9.2 ICDF Complex Operations Subcontractor Personnel

Most activities performed within the ICDF complex are performed by a subcontractor. The following are general descriptions of some of the subcontractor roles.

9.2.1 Project Manager

The PM provides the leadership for the project team by establishing and sustaining the team's vision. The PM is responsible for the ownership and execution of the project execution plan, and technical, schedule, and cost performance baseline management. The PM is directly responsible for all phases of project implementation and execution, including, but not limited to, the following: subcontractor utilization, production, health and safety, quality assurance/quality control, change control, personnel, and regulatory compliance.

9.2.2 Facility Manager

The facility manager is responsible for managing the day-to-day operations of all aspects of the ICDF Complex (including the SSSTF, the ICDF disposal cells, the evaporation pond, and the leachate collection system) and for ensuring the safe and efficient operation of the facility. The facility manager is the agent of the ICDF Complex M&O contractor facility manager in performance of the roles and responsibilities outlined in Section 9.1.4. The facility manager is also responsible for:

- Inspecting the facility and preparing appropriate inspection documentation
- Maintaining the assigned facility and being cognizant of work being conducted in the facility
- Routinely performing facility walk-throughs to assess material condition, equipment operability, and compliance with applicable requirements
- Ensuring that all personnel who perform work in the facility have the necessary qualifications (competence commensurate with responsibilities) and ensuring that all personnel maintain required training for job performance
- Ensuring timely reporting (<1 hour) of all events and unusual occurrences in accordance with the contract and this HASP.

If the facility manager leaves the facility, an alternate will be appointed. The identity of the acting facility manager shall be communicated to facility personnel, the POC, project manager, and M&O contractor facility manager.

9.2.3 Operations Superintendent

The operations superintendent is the direct line management for ICDF Operations. Responsibilities include oversight of all ICDF operations activities, facilitating production goals through innovative approaches to operations, safe and efficient operations, resource management, procedural compliance, and labor relations.

9.2.4 Operations Personnel

Operations personnel will perform the day-to-day waste staging and placement tasks, leachate management, and waste preparation and facility inspection activities at the ICDF. Examples of these duties include, but are not limited to, the following: (1) hauling and placing waste in the disposal cell, (2) checking and recording process instrumentation readings to ensure that facility systems are operating within design parameters and specifications, (3) operating the truck loading/unloading facility at the evaporation pond, (4) operating the stabilization unit, (5) performing the required daily rounds and keeping the associated logs, (6) scheduling maintenance activities, (7) monitoring water levels at the evaporation pond, and (8) performing other operational duties specified by the facility manager.

9.2.5 Health and Safety Officer

The HSO is the person assigned to the facility who serves as the primary contact for all health and safety issues. The HSO advises the subcontractor facility manager on all aspects of health and safety and is authorized to stop work at the facility if any operation threatens worker or public health and safety. In addition, the HSO is authorized to verify compliance with the HASP, to conduct conformance inspections and self-assessments, to require and monitor corrective actions, and to monitor decontamination procedures, as appropriate. The HSO is also responsible for establishing and monitoring training requirements.

The HSO is responsible for performing all personnel exposure monitoring and sampling, both for subcontractor employees as well as for M&O contractor personnel (primarily RadCon support personnel). All personal exposure monitoring data for M&O contractor personnel will be shared with the M&O contractor industrial hygienist assigned to the ICDF Complex. All exposure monitoring data for subcontractor personnel will be made available for review to the M&O contractor industrial hygienist upon request.

9.2.6 Staging, Storage, Sizing, and Treatment Facility Technical Lead

The SSSTF technical lead is responsible for managing the day-to-day operations of all aspects of the SSSTF and for ensuring the safe and efficient operation of the facility. The SSSTF technical lead is also responsible for:

- Inspecting the facility and preparing appropriate inspection documentation
- Maintaining the assigned facility and being cognizant of work being conducted in the facility
- Routinely performing facility walk-throughs to assess material condition, equipment operability, and compliance with applicable requirements
- Ensuring that all personnel who perform work in the facility have the necessary qualifications (competence commensurate with responsibilities) and ensuring that all personnel maintain required training for job performance.

9.2.7 ICDF Project Engineer

The project engineer is responsible for overall technical issues identified during day-to-day operations of all aspects of the ICDF Complex, including the SSSTF, the ICDF disposal cells, the evaporation pond, and the leachate collection system. The PE is also responsible for schedule integration, task prioritization, and conflict resolution of technical and functional requirements, variance analysis, and corrective action. The PE will have daily and frequent contact with not only the functional area leads, but also Stoller's Health and Safety, Configuration Management, and Quality staff.

9.2.8 System Engineer

The system engineer is the technical lead for all operational systems of the ICDF Complex. The system engineer is responsible for the technical oversight of ICDF Complex operations/maintenance systems, configuration management, waste placement, operational parameter control, inventory control, and control of spares and materials.

9.2.9 Waste Acceptance Criteria Lead

The waste acceptance criteria lead is responsible for the following:

- Determining ICDF waste verification sampling/analysis requirements
- Providing technical acceptance and approval of all waste streams destined for disposition at the ICDF Complex
- Interfacing with and providing guidance to generating waste area group personnel.

9.3 Visitors

Visitors are personnel with official business, but who do not perform any operational work tasks at the ICDF. This may include M&O contractor personnel, representatives of DOE, and/or state or federal regulatory agencies.

All visitors with official business at the ICDF must wear the appropriate PPE and receive a briefing to this HASP before proceeding beyond the ICDF fence. A fully trained facility representative (such as the facility manager or HSO) will escort visitors entering the ICDF.

NOTE: *Visitors are not allowed to enter the ICDF operational disposal cells during heavy equipment operation or other areas as identified by the HSO to minimize safety and health hazards. The facility manager and HSO, in consultation with RadCon personnel, will make the determination as to any visitor's demonstrated "need" for access into the ICDF.*

Visitors with no official business at the ICDF will not be permitted onsite.

9.4 Occasional Site Workers

Personnel who have assigned work tasks at the ICDF, but who do not perform them on a regular basis are defined as occasional site workers. Examples of occasional site workers include well monitoring personnel, compaction testing personnel, surveyors, and sanitation service personnel. Occasional site workers must meet the training requirements outlined in Table 6-1 and the training matrix or receive a briefing to this HASP and be escorted.

10. EMERGENCY RESPONSE PLAN

This emergency response plan defines the roles and responsibilities of ICDF personnel during an emergency. Such an emergency could be at the ICDF, INTEC, or a Sitewide emergency. Applicable INEEL policies and procedures may be activated in response to events occurring at the ICDF Complex. Once the INEEL plan is activated, ICDF operations personnel will follow the direction and guidance communicated by the CFA Emergency Response Organization (ERO) team.

NOTE: *The OSHA HAZWOPER definition of an emergency is not defined the same as classified by DOE Orders 151.1B, "Comprehensive Emergency Management System," and 231.1A, "Environment, Safety, and Health Reporting." For this reason, the term "event" will be used in this section when referring to project HAZWOPER emergencies.*

10.1 Preemergency Planning

The INEEL policies and procedures provide the basis for preplanning all INEEL emergency events. This preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect project activity. Preplanning also ensures that this ICDF emergency response plan is integrated with the INEEL emergency response programs. Specific procedures for addressing emergency events and actions to be taken are further described in the facility-specific emergency implementing procedures. Finally, this HASP addresses project-specific hazards, potential emergency events, and the actions to take following such events.

10.2 Emergency Preparation and Recognition

Preparation and training on emergencies will include proper ICDF access and egress procedures in response to ICDF events and INEEL emergencies as part of the HASP training. Visitors also will receive this training on a graded approach based on their ICDF access requirements. Visitor training will include alarm identification and take cover and evacuation procedures. Emergency phone numbers will be located in ICDF operational areas.

Emergencies that could occur include:

- Accidents resulting in serious injury
- Fires, including wildland fires
- Spills of hazardous/radiological materials
- Tornadoes, earthquakes, and other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

10.3 Emergency Facilities and Equipment

Emergency response equipment, including the items described in Table 10-1, will be maintained at the ICDF. In addition, the INEEL fire department maintains an emergency hazardous material response van that can be used to respond to an event or emergency at the ICDF. Fire department personnel are also trained to provide immediate hazardous material spills and medical services. In addition, the CFA-1612

medical facility is manned by medical personnel who can evaluate and stabilize injured personnel or personnel experiencing signs and symptoms of exposure. At least one individual with current medic/first-aid training will be present at the ICDF during operations.

Table 10-1. Emergency response equipment to be maintained at the project site during operations.

Equipment Name and Quantity Required	Location at ICDF	Responsible Person	Frequency of Inspection
Fire extinguishers	Located in the decontamination facility, office trailers, disposal cell (at the dump face), two crest pad buildings, and on each piece of heavy equipment	Facility manager	Monthly
First-aid supplies	Administrative office trailer, some vehicles	Facility manager	Weekly
Eye wash station	SSSTF (when operational); somewhere onsite until SSSTF is operational	Facility manager	Monthly or the frequency determined by the manufacturer
Eye wash bottle ^a	Any work location where chemicals that are injurious to the eyes are used	Facility manager	Per manufacturer
Hazardous materials spill kit	Throughout the facility	Facility manager	Monthly
Communication equipment available	Onsite	Facility manager	Availability and daily functional check

a. An eyewash bottle will be used to provide an immediate eye flush, if required. Employees are instructed to use the bottles and immediately proceed to an eyewash station and flush eyes for 15 minutes.
SSSTF = Staging, Storage, Sizing, and Treatment Facility

10.4 Emergency Communications

In the event of an emergency, the capability to summon INEEL emergency response resources, to immediately notify facility personnel, and to inform others of site emergencies is required. Communications equipment at the task site will be a combination of radios, telephones (mobile, cellular, or facility), and pagers.

10.4.1 Notifications

The POC will be notified of any project emergency event. The POC will then make the required ERO and Warning Communications Center (WCC) notifications. The following information should be communicated, as available, to the POC:

- The caller's name, title (e.g., facility manager or HSO), and telephone number
- Exact location of the emergency
- Nature of the emergency, including time of occurrence, current site conditions, and special hazards in the area
- Injuries (if any) including numbers of injured, types of injuries, and conditions of injured

- Emergency response resources required (e.g., fire, hazardous material, and ambulance)
- Additional information as requested.

NOTE: *If the POC cannot be contacted, the WCC will be notified of the event directly by ICDF operations personnel. The WCC must be told that notification to the POC has not been made. In the case of fires or medical emergencies where an ambulance is needed, facility personnel may notify the WCC or CFA fire department directly, before notifying the POC, to facilitate speedy response. However, the POC must still be contacted immediately after emergency services are summoned.*

Following notification of the POC, the ICDF Complex M&O contractor facility manager will also be notified of any emergency event. This notification is secondary to the POC and WCC notifications.

10.5 Personnel Roles, Lines of Authority, and Training

10.5.1 The Idaho National Engineering and Environmental Laboratory Emergency Response Organization

The INEEL ERO structures are based on the Incident Command System and are described in applicable INEEL policies and procedures.

10.5.2 Role of Project Personnel in Emergencies

Depending on the event, a graded response and subsequent notifications will take place. Project personnel responsibilities are described below. Personnel will respond to emergencies only within the limits of their training and designated by their position. All personnel, including visitors, are trained to the facility-specific emergency actions as part of the HASP training and/or briefing.

10.5.2.1 Subcontractor Facility Manager. The ICDF Complex facility manager, or designated alternate, is responsible for initiating all requests for emergency services (e.g., fire, medical) and for notifying the POC of abnormal or potential abnormal events occurring at the ICDF. In addition, the facility manager or designated alternate will serve as the facility area warden. This individual is responsible for conducting personnel accountability at the facility. This will be accomplished by completing positive sweeps of all facility areas to ensure that all personnel are aware of the emergency event. All personnel will be directed to the designated assembly point where the accountability board and attendance log will be used to determine what personnel are onsite (role call). The facility manager will then report accountability status to the CFA area warden coordinator.

Additionally, the facility manager will control the scene until a member of the Incident Command System authority arrives at the scene to take control as the on-scene commander. When communicating emergency information to the on-scene commander, the facility manager or designated alternate will provide all requested information regarding the nature of the event, potential hazards, and other information requested.

10.5.2.2 ICDF Personnel. Every person at the ICDF has a role to play during an event or INEEL emergency. Each employee must be constantly aware of potential problems or unexpected hazardous situations and immediately report these situations to the facility manager or designated alternate. All employees are expected to watch out for their fellow workers, to report their concerns to the facility manager, and to respond to emergency events, as provided for in this HASP. Specific facility personnel responsibilities are outlined in Table 10-2.

Table 10-2. Responsibilities during an emergency.

Responsible Person	Action Assigned
Any ICDF worker	Warn others and notify facility manager of emergency event.
Any fire-extinguisher-trained worker	Extinguish incipient fires only (on a voluntary basis—personnel may opt to immediately notify fire department).
Any first-aid/CPR-trained personnel	Provide first aid within level of training (on a voluntary basis).
Facility manager or designee	Contact the POC (or WCC directly if POC cannot be contacted or if ambulance is needed).
Facility manager or trained alternate	Conduct personnel accountability and report information to the CFA area warden coordinator.
Facility manager or designee	Report fires to the INEEL fire department.
Facility manager or HSO	Report occupational injuries/illnesses to the POC.
CFA = Central Facilities Area CPR = cardiopulmonary resuscitation HSO = health and safety officer ICDF = INEEL CERCLA Disposal Facility INEEL = Idaho National Engineering and Environmental Laboratory WCC = Warning Communications Center	

10.5.3 Spills



A specific ICDF operational procedure has been developed to cover responses to spills. This procedure incorporates a graded approach to spill response based on the quantity and type of material spilled. All spills will be reported to the POC.

10.6 Emergency Alerting, Responses, and Sheltering

10.6.1 Alarms

Fire alarms are the only audible alarm systems at the ICDF. Emergency sirens located throughout INTEC provide a means for signaling emergency TAKE COVER or EVACUATION protective actions. The primary method of signaling emergency events at the ICDF is via radios, phones (mobile, cell, or office), and pagers.

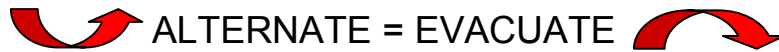
10.6.1.1 Take Cover—Continuous Siren. Radiation or hazardous material releases, adverse weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The signal to take cover is a CONTINUOUS SIREN.

 STEADY = STAY 

However, the order to take cover also can be given by word of mouth, radio, or voice paging system. When ordered to TAKE COVER, ICDF operations personnel will place ICDF operations and equipment in a safe configuration (as appropriate) and then seek shelter in ICDF buildings or vehicles (if outside the facility). Eating, drinking, and smoking are not permitted during take-cover conditions.

The RadCon personnel will assist and direct all workers exiting from radiological contamination areas during a TAKE COVER alarm.

10.6.1.2 Total Area Evacuation—Alternating Siren. A total area evacuation is the complete withdrawal of personnel from the entire ICDF and INTEC area. The evacuation signal is an ALTERNATING SIREN.



When ordered to EVACUATE, project personnel will place ICDF operations and equipment in a safe configuration (as appropriate) and then proceed to the designated assembly area. The facility manager or trained alternate will then complete the personnel accountability and report the results of the accountability process to the CFA area warden coordinator.

The RadCon personnel will assist and direct all workers exiting from radionuclide-contamination areas during an EVACUATION alarm. Eating, drinking, and smoking are not permitted during emergency evacuations.

10.6.1.3 Local Area Evacuation. A local area evacuation is the evacuation of an individual building or the complete withdrawal of personnel from the ICDF, but it does not require the evacuation of other INEEL facilities. Local area evacuation orders will be given by word of mouth, radio, or phone. When ordered to evacuate the facility, personnel shall place the ICDF in a safe condition (as appropriate) and then proceed to the assembly area designated for local area evacuations or as directed by the facility manager or designee. Eating, drinking, and smoking are not permitted during local area evacuations.

Facility RadCon personnel will assist and direct all workers exiting from radiological contamination areas during a local area evacuation.

10.7 Evacuation Assembly Areas and Central Facilities Area Medical Facility

In the event that the ICDF is evacuated, personnel shall assemble in the designated assembly area, or as directed by the facility manager. The primary assembly area is located approximately 70 yd west of the front entrance of the administrative office trailer, next to the fence, and is designated by a sign. A secondary assembly area is located at the west gate near the northwest corner of the disposal cell. Personnel shall only gather at the secondary assembly area if instructed to do so. An INEEL bus will be dispatched to ICDF for transporting personnel in the event of an evacuation. The location of the CFA medical facility is shown in Figure 10-1.

10.8 Reentry, Recovery, and Site Control

All reentry and recovery activities will follow general site security and control requirements identified in Section 7 unless conducted as part of an emergency response action.

10.8.1 Reentry

During an event response, it is sometimes necessary to reenter the scene of the event. Reasons for performing a reentry may include:

- Performing personnel search and rescues

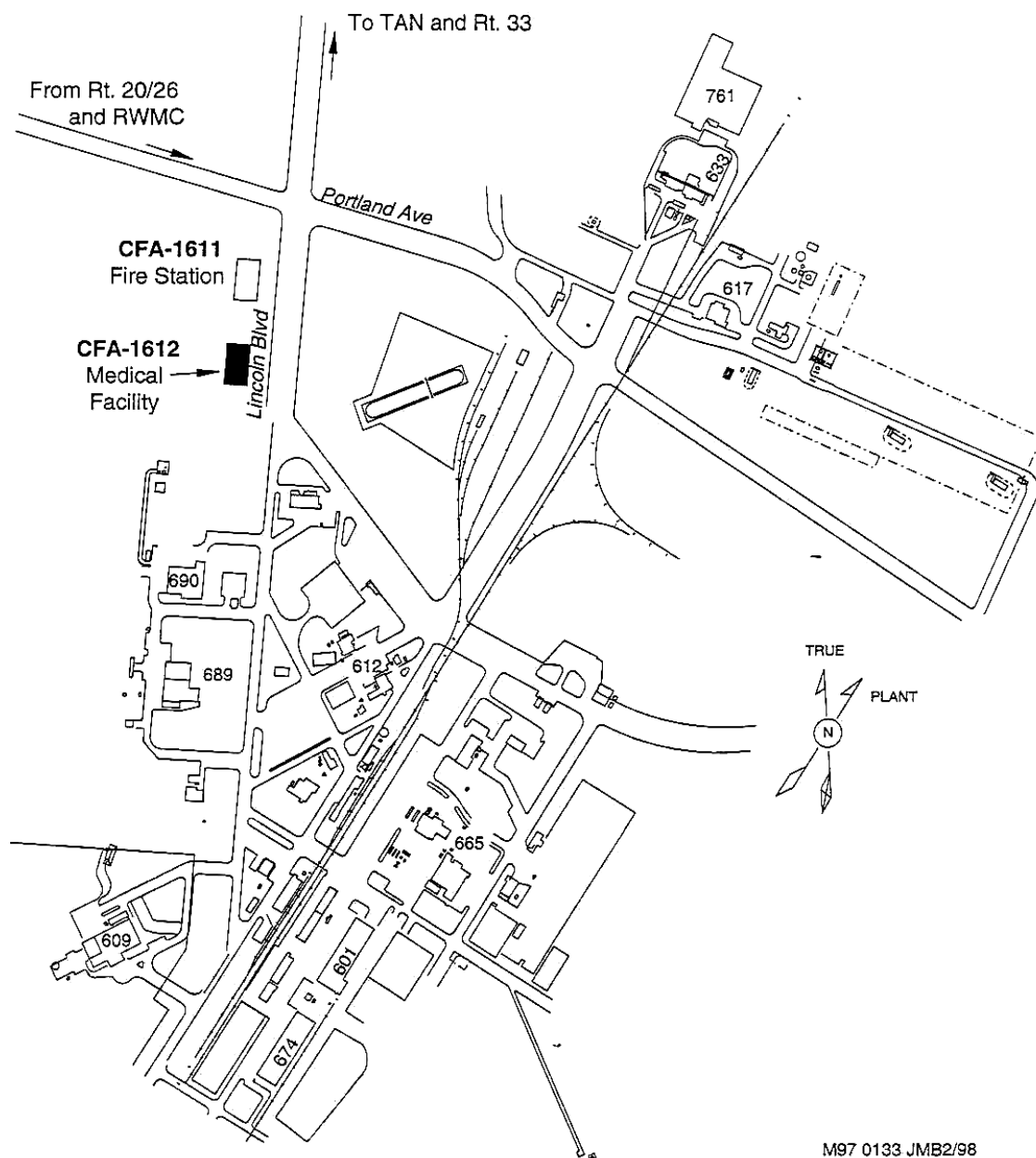


Figure 10-1. Map showing the route to the nearest medical facility (CFA-1612).

- Responding to medical first-aid needs
- Performing safe shutdown actions
- Performing mitigating actions
- Evaluating and preparing damage reports
- Performing radiation or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken as a graded approach depending on the nature of the initiating event. Events involving the activation of the CFA ERO automatically transfer planning and authorization for reentry to the CFA emergency action manager.

10.8.2 Recovery

After the initial corrective actions have been taken and effective controls established, response efforts will shift toward recovery. Recovery is the process of assessing postevent and postemergency conditions and developing a plan for returning to preevent and preemergency conditions, when possible, and following the plan to completion. Events involving the activation of the CFA ERO automatically transfer planning and authorization for recovery operations to the CFA emergency action manager until such responsibility is transferred back to the ICDF project manager or ICDF complex facility manager.

10.9 Critique of Response and Follow-up

A review and critique will be conducted following all events, drills, and exercises at the INEEL. In some cases, an investigation may be required before commencing recovery actions. For this reason, care shall be exercised to preserve evidence when appropriate.

10.10 Telephone and Contact Reference List

A telephone and contact list will be available in the administrative office trailer. Because personnel listed may change frequently, working copies of this list will be generated as required to note new positions and changes of personnel assigned. An emergency contact list with phone numbers will be posted at all times.

10.11 Backshift Accountability

Personnel working at the ICDF during the back shift (late evenings or weekends, including Friday) will use the CFA Back Shift Accountability System to record their presence at the facility. Personnel will also contact the INTEC shift manager.

11. DECONTAMINATION PROCEDURES

The ICDF operations may involve some decontamination of waste containers and associated vehicles. Every effort will be made to prevent contamination of ICDF personnel and equipment through the use of engineering controls, isolation of source materials, contaminant monitoring, personnel contamination control training, and by following material handling requirements and procedures for contaminated or potentially contaminated materials. If contact with potentially contaminated surfaces is anticipated, then additional engineering controls, in combination with PPE upgrades, may be necessary to control the contact hazard. However, if chemical or radiological contamination is encountered at levels requiring decontamination, this section provides general guidance on how it will be performed.

11.1 Contamination Control and Prevention

Contamination control and prevention procedures will be implemented to minimize ICDF personnel contact with contaminated surfaces if such surfaces are encountered or may be contacted during ICDF operations. The use of engineering controls, protective barriers, protective clothing, modified work control practices, or addition of hold points and surveys will all be used to minimize direct contact with contaminated surfaces. The following contamination control and prevention measures will be employed if contamination is encountered or anticipated:

- Identify potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants
- Limit the number of personnel, equipment, and materials that enter the contaminated area
- Implement immediate decontamination procedures to prevent the spread of contamination (if contamination is found on the outer surfaces of equipment)
- Use only the established control entry and exit point from the contaminated area to minimize the potential for cross-contamination and expedite contamination control surveys
- Wear disposable outer garments and use disposable equipment (where possible)
- Use hold points defined in procedures and work orders to monitor for contamination where anticipated.

11.2 Equipment and Personnel Decontamination

The ICDF decontamination procedures will be developed on a case-by-case basis for decontamination of waste containers and associated vehicles in order to prevent the spread of contamination and to meet additional ICDF operational requirements. In addition, equipment decontamination is necessary to control contamination and protect personnel at other areas within the ICDF Complex. Both radiological and chemical contamination will be evaluated when decontaminating surfaces.

Radionuclide decontamination operations for equipment or areas will be performed in accordance with applicable RadCon manuals and at the direction of RadCon personnel. Chemical decontamination will be conducted on a case-by-case basis under the direction of the HSO. In all cases, the collection, storage, and disposal of decontamination waste will be addressed prior to the generation of such waste in accordance with the waste management plan. Protective clothing and respiratory protection selected for decontamination tasks will be based on the contaminant being removed and will be listed on a JSA, RWP, or other work control document.

11.2.1 Equipment Decontamination

Sealed waste containers and other isolation controls will be used, where feasible, to prevent contamination of ICDF equipment and facilities from known or suspected sources of contamination. These controls will serve to isolate and eliminate or mitigate many of the potential contamination pathways to prevent equipment contamination and greatly reduce the need for decontamination.

When required, equipment decontamination will be conducted in accordance with established ICDF decontamination procedures. Low-cost consumable items will be discarded if initial decontamination efforts fail or extensive decontamination is required that is not in accordance with ALARA principles.

11.2.2 Personnel Decontamination

Engineering controls, in conjunction with facility contamination prevention and control practices and proper protective clothing donning and doffing procedures, will serve as the primary means to eliminate the need for personnel decontamination. The PPE selection, as identified in the RWP and JSA, will provide for the layered barriers required to prevent permeation and minimize external surface contamination.

If radiological contamination areas are established, procedures for donning and doffing protective clothing will be posted at the entrance and exit. The greatest potential for personnel contamination exists from improper doffing of contaminated protective equipment when exiting a contamination area.

11.2.3 Decontamination in Medical Emergencies

If a person is injured or becomes ill, he should immediately be evaluated by first-aid-trained personnel (within their level of training and on a voluntary basis) at the ICDF. If the injury or illness is serious, then the facility manager will contact the CFA fire department or the WCC to summon emergency services.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible) and other contaminated areas with an item such as a bag or a glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), potentially contaminated areas of the individual will be wrapped in plastic, blankets, or available material to help prevent contaminating the inside of the ambulance, medical equipment, and medical personnel.

The HSO and/or RCT (depending on the type of contamination) shall accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE will then be removed at the CFA medical facility (CFA-1612) and carefully handled to prevent the spread of contamination. Applicable company policies and procedures contain information on proper handling of radionuclide-contaminated wounds.

11.3 Doffing Personal Protective Equipment and Decontamination

Decontamination of PPE clothing prior to doffing is generally not performed at the ICDF Complex, because the concentrations of the hazardous constituents are low enough that utilization of the INEEL radiological doffing procedures is adequate to control the spread of contamination. Removal of contaminated protective clothing using standard radiological doffing techniques provides the most effective method for containing and isolating the contaminants and greatly reduces the potential for

exposure to other personnel who would be put at risk of cross-contamination from other decontamination methods (e.g., washing and brushing).

If the protective clothing also is worn as an anticontamination layer, then tape, gloves, booties, and any required dosimetry will be removed following the posted sequence. All PPE will be placed in the appropriately labeled waste-disposal containers. Doffing and any required decontamination will take place at the designated work area boundary or in a contamination RBA or step-off pad. If exiting an RCA, personnel will conduct the proper personal survey, as stated in the RWP.

11.4 Personnel Radiological Contamination Monitoring

Personnel contamination monitoring (with hand-held detectors and automated whole-body counters) may be required before exiting ICDF operational areas, as determined appropriate by RadCon personnel or as stated in the RWP and on postings for the respective radiological control area.

11.5 Storage and Disposal of Operational Waste Materials

Waste generated from decontamination and other ICDF operational activities will be properly characterized, stored, and disposed of in accordance with applicable manuals and established ICDF procedures.

11.6 ICDF Sanitation and Waste Minimization

The ICDF personnel will use washroom and restroom facilities located at the ICDF Complex. Potable water and soap are available at the ICDF Complex for personnel to wash their hands and faces.

Industrial waste materials will not be allowed to accumulate at the ICDF operations area. Appropriate containers for industrial waste will be maintained at the ICDF. Personnel should make every attempt to minimize waste through judicious use of consumable materials. All ICDF personnel are expected to make good housekeeping a priority at the ICDF.

12. RECORDKEEPING REQUIREMENTS

This section lists the recordkeeping requirements necessary for this project.

12.1 Industrial Hygiene and Radiological Monitoring Records

Airborne monitoring and sampling data (both area and personal) for INEEL M&O contractor personnel will be turned over to the M&O contractor industrial hygienist for recording in the INEEL Hazards Assessment and Sampling System database. Monitoring and sampling data for subcontractor personnel will be recorded and maintained in records as required by the subcontract; these data will be available for review by the M&O contractor. All monitoring and sampling equipment will be maintained and calibrated in accordance with INEEL procedures, subcontract requirements, and manufacturer specifications, as applicable. Industrial hygiene airborne monitoring and sampling data are treated as limited access information and maintained in accordance with applicable requirements.

The assigned RCT maintains a logbook of radiological monitoring, daily project operational activities, and radiological survey records. Radiological monitoring records are maintained in accordance with applicable RadCon manuals. A log is also maintained of daily source checks and checks for survey instrumentation having current calibration.

All health, safety, and radiological records, including inspections, will be maintained in accordance with the appropriate and applicable requirements as identified in applicable manuals and ICDF procedures.

12.2 Records Management

The Idaho Completion Project Administrative Record and Document Control (ARDC) office organizes and maintains data and reports generated by field activities. The ARDC office maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of project plans, this HASP, the quality program plan, the quality assurance project plan, and other documents pertaining to these operations are maintained in the project file by the Idaho Completion Project ARDC office.

All additional ICDF records will be maintained in accordance with applicable federal and state requirements, INEEL manuals, and facility-specific supplements.

13. REFERENCES

- 10 CFR 835, 2002, "Occupational Radiation Protection," *Code of Federal Regulations*, Office of the Federal Register, February 2002.
- 10 CFR 835, Subpart C, 2002, "Standards for Internal and External Exposure," *Code of Federal Regulations*, Office of the Federal Register, February 2002.
- 29 CFR 1910, 2004, "Occupational Safety and Health Standards," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1910, Subpart Z, 2004, "Toxic and Hazardous Substances," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1910.120, 2004, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1910.1003, 2004, "13 Carcinogens (4-Nitrobiphenyl, etc.)," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1910.1018, 2004, "Inorganic Arsenic," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1910.1027, 2004, "Cadmium," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1910.1028, 2004, "Benzene," *Code of Federal Regulations*, Office of the Federal Register, September 2004.
- 29 CFR 1926, 2004, "Safety and Health Regulations for Construction," *Code of Federal Regulations*, Office of the Federal Register, June 2004.
- 49 CFR 171, 2004, "General Information, Regulations, and Definitions," *Code of Federal Regulations*, Office of the Federal Register, October 2004.
- 15 USC § 2601 et seq., 1976, "Toxic Substances Control Act," *United States Code*.
- 42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act (Solid Waste Disposal Act)," *United States Code*.
- 42 USC § 6921 et seq., 1976, "Identification and Listing of Hazardous Waste," *United States Code*.
- 42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*, December 11, 1980.
- 54 FR 48184, 1989, "National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule," *Federal Register*, U.S. Environmental Protection Agency, November 1989.
- ACGIH, 2004, *Guide to Occupational Exposure Values*, American Conference of Governmental Industrial Hygienists.

ASA-124, 2003, "Auditable Safety Analysis, INEEL CERCLA Disposal Facility Complex," Rev. 0, Idaho National Engineering and Environmental Laboratory, May 2003.

DOE O 151.1B, 2003, "Comprehensive Emergency Management System," U.S. Department of Energy, October 29, 2003.

DOE O 231.1A, 2004, "Environment, Safety, and Health Reporting," Change 1, U.S. Department of Energy, June 3, 2004.

DOE O 435.1, Chg 1, 2001, "Radioactive Waste Management," U.S. Department of Energy, August 28, 2001.

DOE O 440.1A, 1998, "Worker Protection Management for DOE Federal and Contractor Employees," U.S. Department of Energy, March 27, 1998.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, Administrative Docket No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 4, 1991.

DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, U.S. Department of Energy Idaho Operations Office, October 1999.

DOE-ID, 2003, *ICDF Complex Operations and Maintenance Plan*, DOE/ID-11000, Rev. 1, U.S. Department of Energy Idaho Operations Office, October 2003.

DOE-ID, 2004, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning*, DOE/ID-10587, Rev. 8, U.S. Department of Energy Idaho Operations Office, March 2004.

DOE-STD-1090-01, 2001, "Hoisting and Rigging," U.S. Department of Energy, April 2001.

EDF-ER-264, 2004, "INEEL CERCLA Disposal Facility Design Inventory," Rev. 2, Idaho Completion Project, June 2004.

EDF-ER-327, 2004, "INEEL CERCLA Disposal Facility Short-Term Risk Assessment," Rev. 1, Idaho Completion Project, September 2004.

HAD-136, 2002, "Hazard Assessment Document, ICDF Complex Hazard Classification," Rev. 0, Idaho National Engineering and Environmental Laboratory, May 2002.

Idaho Code § 39-4401 et seq., 1983, "Hazardous Waste Management Act of 1983," State of Idaho, Boise, Idaho.

LMITCO, 1998, *Implementation Project Management Plan for the Idaho National Engineering and Environmental Laboratory Remediation Program*, Lockheed Martin Idaho Technologies Company.

NFPA 70E, 2004, "Standard for Electrical Safety Requirements for Employee Workplaces," National Fire Protection Association, January 1, 2004.

PRD-2110, 2003, "Confines Spaces," Rev. 2, *Subcontractor Requirements Manual*, Idaho National Engineering and Environmental Laboratory, June 2003.

PRD-5001, 2002, "Training and Indoctrination," Rev. 3, *Subcontractor Requirements Manual*, Idaho National Engineering and Environmental Laboratory, April 2002.

Project and Construction Management Department, 2004, *Subcontractor Requirements Manual*, TOC-59, Rev. 40, Idaho Completion Project, September 2004.

